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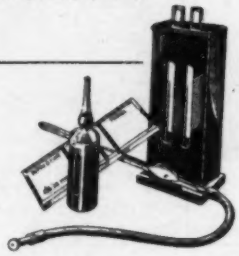

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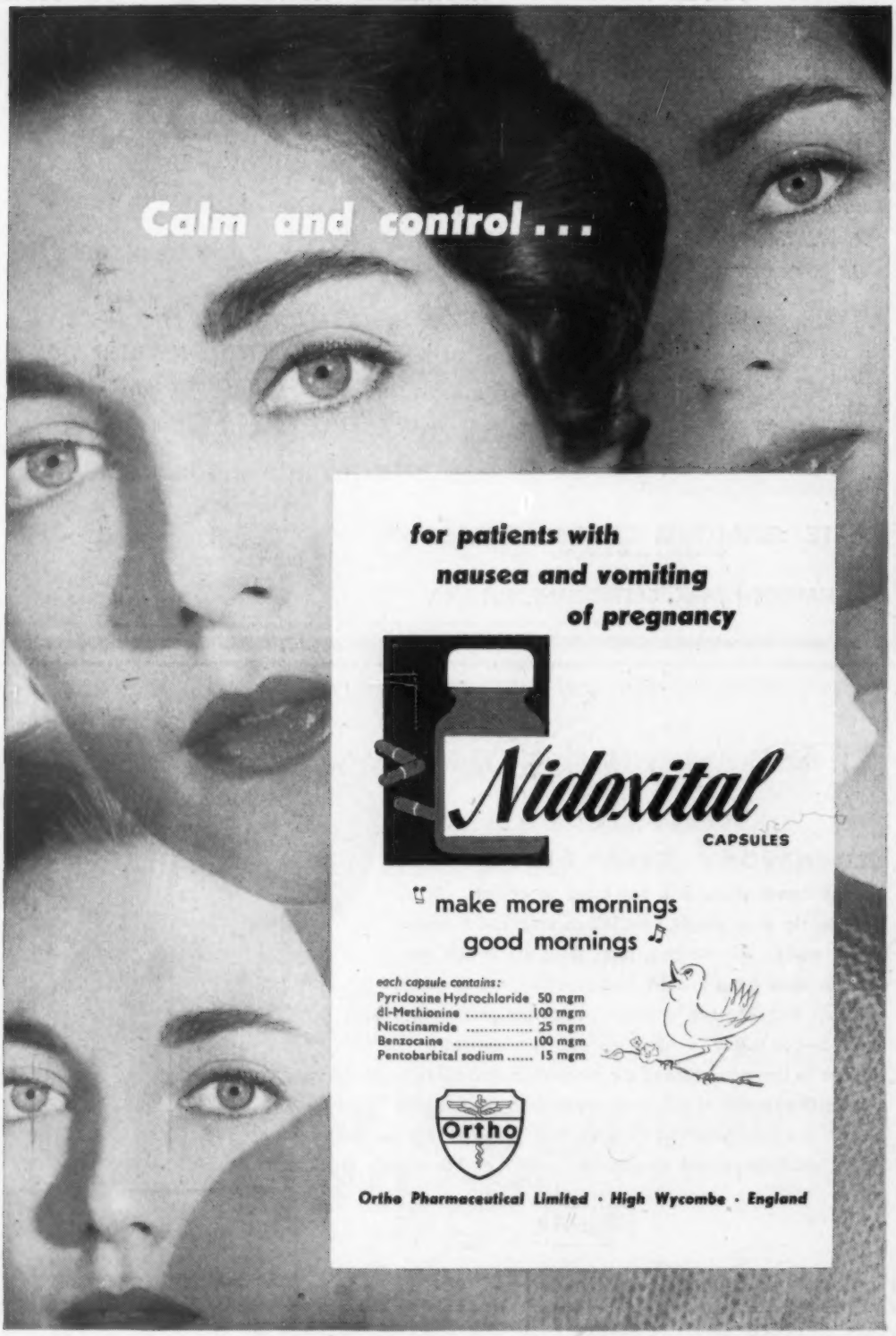
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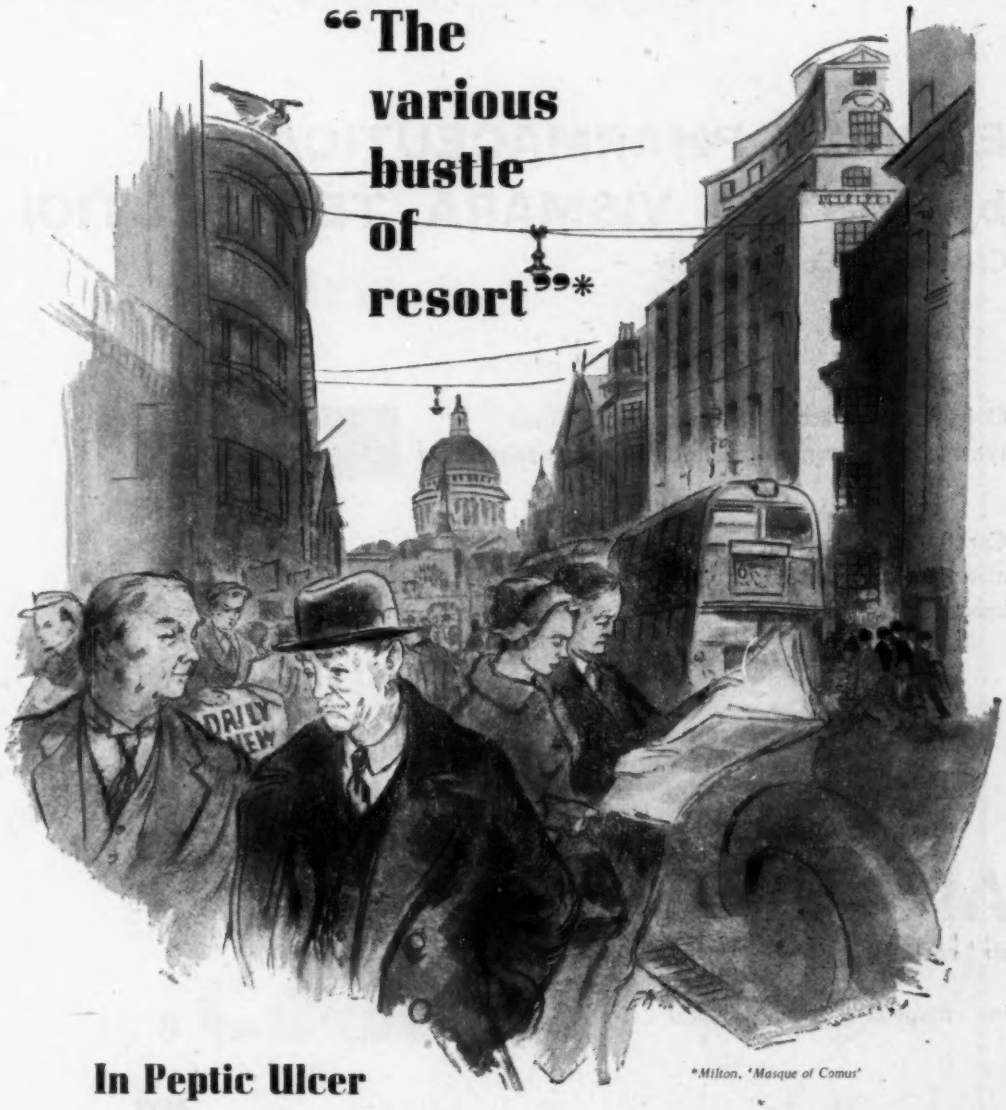

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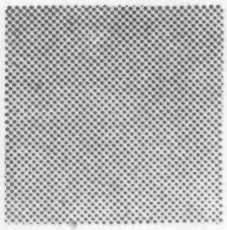

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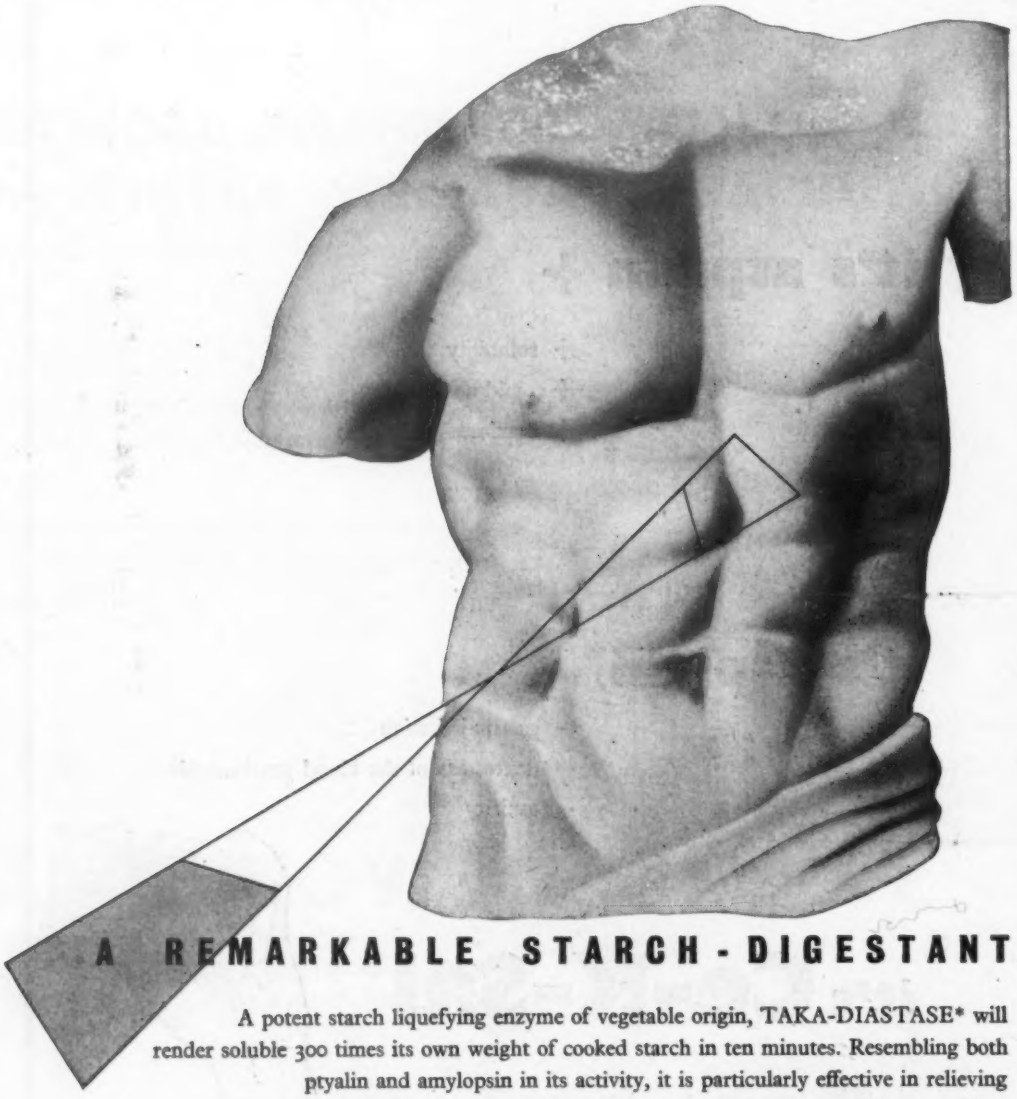

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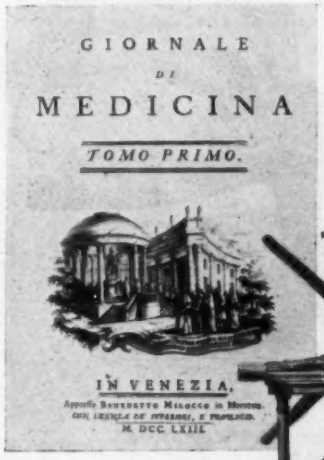

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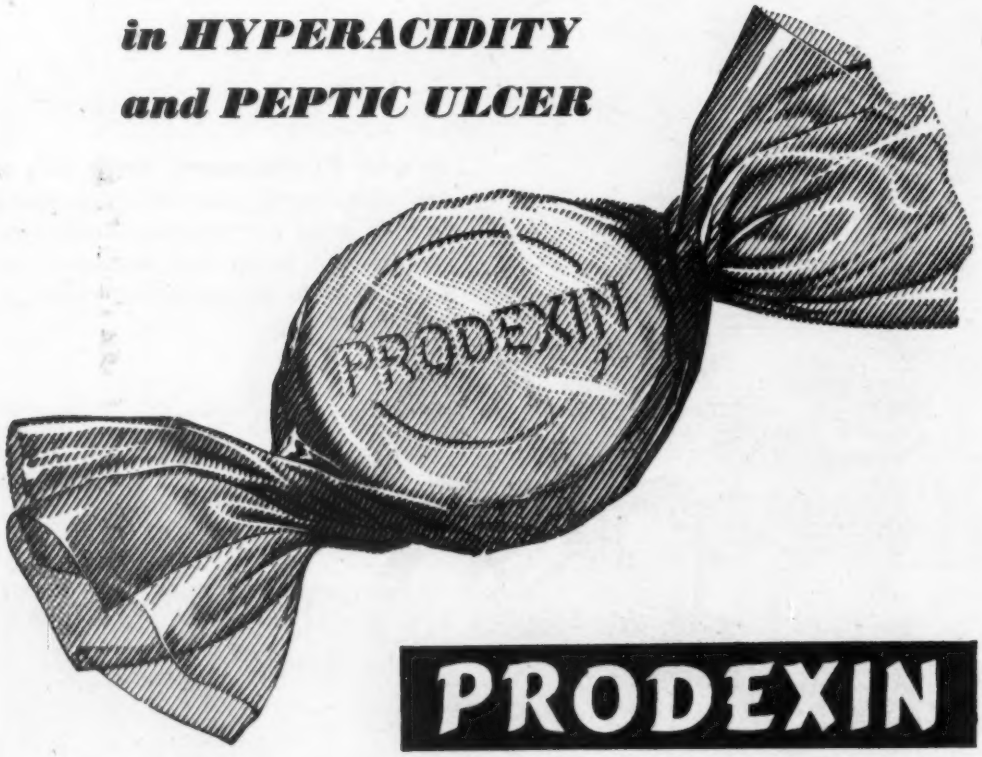

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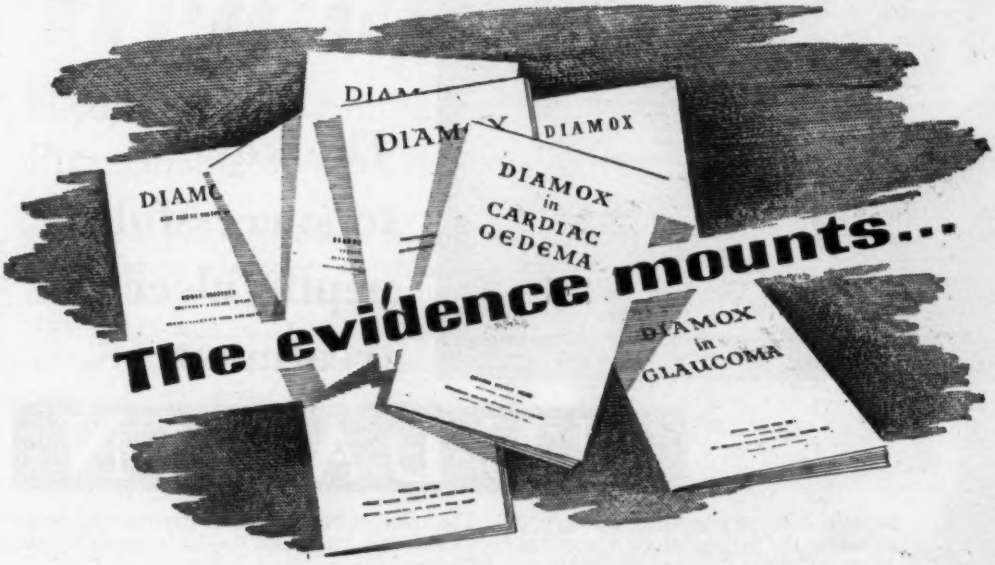

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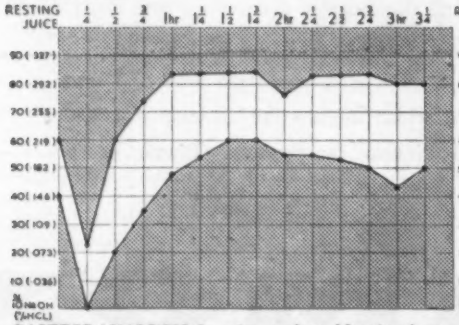
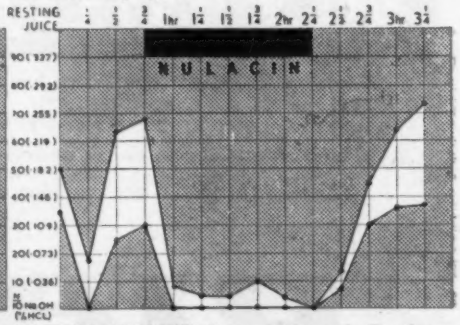


GASTRIC ANALYSIS *Superimposed gruel fractional test-meal curves of five cases of duodenal ulcer.*



GASTRIC ANALYSIS *Same patients as in Fig. 1, two days later, showing the striking neutralizing effect of sucking Nulacin tablets (3 an hour). Note the return of acidity when Nulacin is discontinued.*

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Ambulatory Continuous Drip Method in the treatment of Peptic Ulcer. *Amer. Jour. Dig. Dis.* March 1955 22 67-71.

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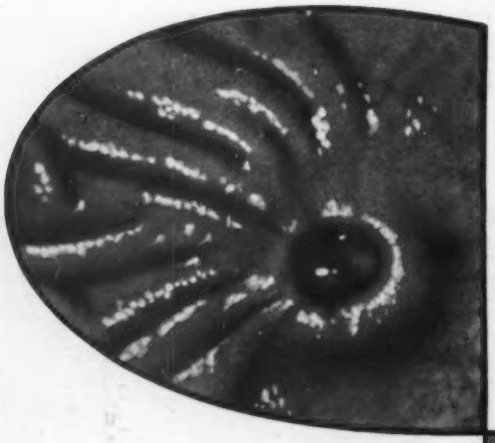

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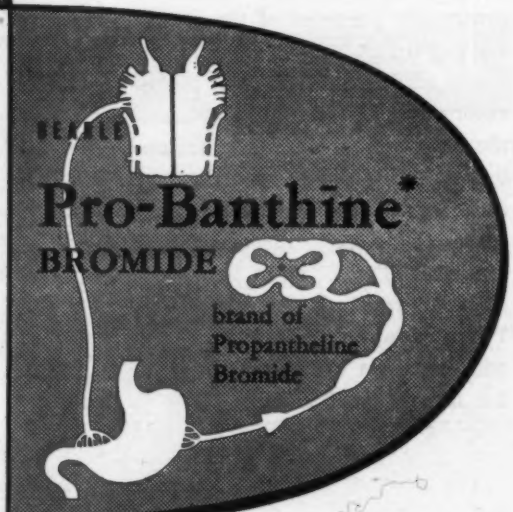

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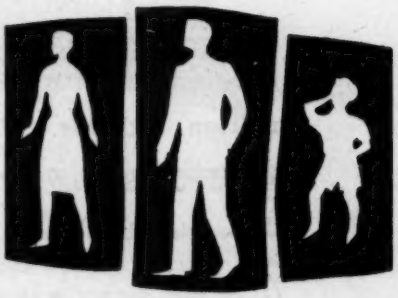

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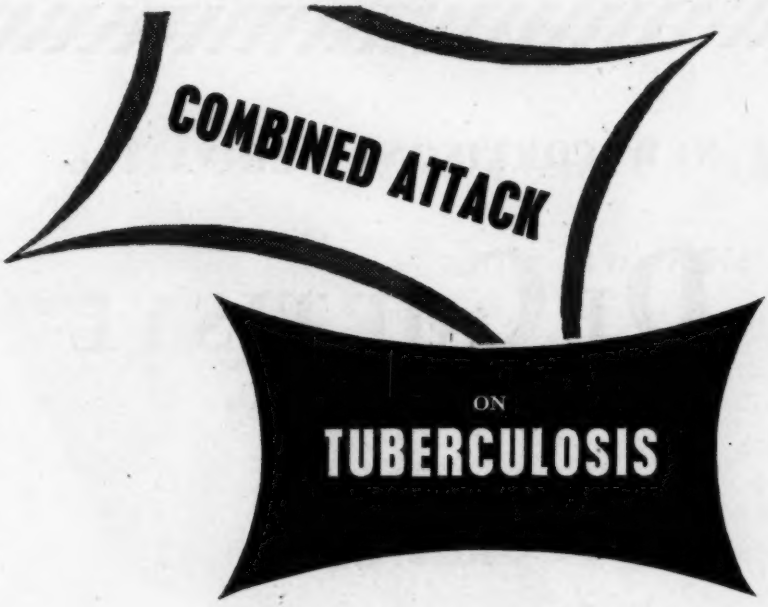
[1] *Lancet, 1951, ii, 749*
[2] *Jour. Aviation Med., 16 : 59, 1945*



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1. Transactions 13th Conference on Chemotherapy of Tuberculosis, Veterans Administration, 1954, Feb., 374.

2. *Proc. Ex. Biol. Med.*, 1954, **87**, 245.

3. *Lancet*, 1955, **1**, 303.

4. Report to M.R.C. of Tuberculosis Chemotherapy Trials Committee, *Brit. Med. J.*, 1955, **1**, 435.

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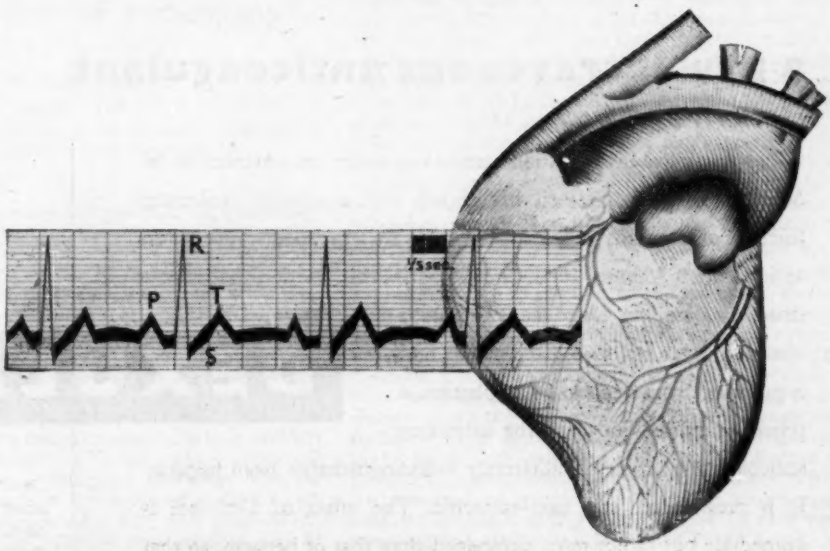

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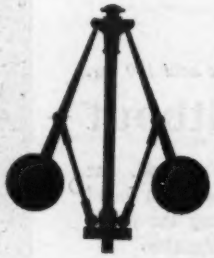

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THE TREATMENT OF PULMONARY TUBERCULOSIS *

J. G. SCADDING
M.D. Lond., F.R.C.P.

DIRECTOR OF STUDIES AND DEAN, INSTITUTE OF DISEASES OF THE CHEST, BROMPTON HOSPITAL, LONDON

I

DURING the past ten years the treatment of pulmonary tuberculosis has been revolutionised by the discovery of antibacterial agents effective against the tubercle bacillus. The rapid accumulation of the basic data necessary for the most efficient use of these agents has been a triumph of collaboration between the clinician and the laboratory worker; and their introduction into clinical practice not only has improved dramatically the results of medical treatment of pulmonary tuberculosis but also has released the surgeon, already well prepared with operative techniques, from the fear of many of the complications which used to restrain his more radical attempts to help patients suffering from the disease. Although many important problems remain to be investigated, the main rules for antibacterial treatment with the drugs at present available are now well established; and the possibilities, both of collapse therapy, medical and surgical, and of lung resection, in combination with antibacterial treatment have been extensively explored. A review of the present situation and a statement, admittedly personal, of current policy may therefore have some immediate practical value before it becomes no more than a historical curiosity.

Trends in Mortality and Morbidity

The effect of antibacterial treatment is reflected in recent mortality figures (fig. 1). There has been a steady though slow reduction in numbers of deaths certified as due to tuberculosis in England and Wales since 1880. This reduction continued at about the same rate, showing no evidence of being affected by the introduction of any one specific therapeutic or preventive measure until the time when antibacterial drugs came into general use, about 1948. Since then the rate of fall of mortality has increased considerably, so that between 1948 and 1953 the number of deaths was reduced by 60%. That this fall is indeed due to improved methods of treatment, rather than to more effective control of spread of infection, is further suggested by the observation that the number of new notifications has diminished much more slowly (by about 11%) over the same period, whereas previously the rates of reduction of numbers of deaths and of new notifications remained approximately similar.

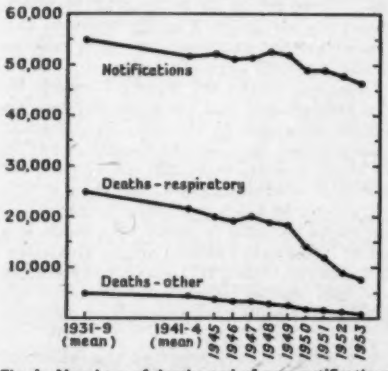

Fig. 1.—Numbers of deaths and of new notifications of tuberculosis in England and Wales, 1931-53 (Ministry of Health report for 1954).

Moreover, a similar reduction in mortality has been observed in all countries since the introduction of antibacterial drugs, whether their mortality-rates were relatively high or relatively low. Thus in Portugal the high death-rate of 142 per 100,000 in 1950 was reduced to 96 in 1952, while in the United States the low death-rate of 27 per 100,000 in 1950 was further reduced to 16 in 1952. The falling mortality from pulmonary tuberculosis is brought into sharp relief by comparison with the rising mortality from lung cancer, the number of deaths from which in England and Wales in 1951 for the first time exceeded, and during 1953 amounted to nearly twice, the number of deaths from pulmonary tuberculosis.

Another epidemiological point is probably of considerable importance in relation to the results of treatment, even though it cannot be stated in such precise numerical terms. The childhood-infection rate in the community has been greatly reduced. In 1949–50 the Medical Research Council National Tuberculin Survey reported that, between the ages of 14 and 15 years, 34·6% of children in southern urban areas of England gave positive reactions to an intradermal test with tuberculin, taken up to 100 T.U. if necessary. In 1930–31, nineteen years previously, among 1003 children examined at the Brompton Hospital, of whom only 279 were known contacts with tuberculosis, 82·2% of those aged 14 gave positive reactions to a similar test (Dow and Lloyd 1931). Since, in the latter investigation, the difference in incidence of positive reactions between contact and non-contact children, though considerable in the younger age-groups, was very small at the age of 14, the inclusion of the 279 known contacts affected the percentage of positive reactors at this age relatively little. In the M.R.C. survey of 1949–50 it was found that the incidence of positive reactors in southern urban areas had risen from 34·6% at age 14–15 to 59·3% in the 19–20 age-group. Hence an important number of primary infections were occurring in adolescence and young adult life. It is probable that this trend towards the avoidance of childhood infection is continuing, together with a consequent increase in the number of primary infections in later life. Although one of the chief benefits expected from B.C.G. vaccination is a reduction in the incidence and consequences of these late primary infections, it is doubtful whether this vaccine has yet been used widely enough in England to have an appreciable effect in this respect.

These points are of importance because a primary infection in adult life tends to behave rather differently from a primary infection in childhood, and differently also from pulmonary disease developing in adult life in a patient who has undergone a primary infection in childhood. Whereas in childhood the lymph-node component of the primary complex is more prominent than the pulmonary component, and its behaviour usually determines the course of the illness, in later life the lymph-node component is less prominent and the pulmonary component usually assumes the dominating rôle. Thus in primary infection in adolescents and young adults there is a strong tendency for the primary pulmonary focus to develop into a considerable area of tuberculous pneumonia, in which caseation or cavitation may occur, and which may thus prove to be the starting-point of a progressive pulmonary tuberculosis. Unfortunately no evidence exists about the possible differences in prognosis between pulmonary tuberculosis starting in this way and pulmonary tuberculosis starting in an adult who has undergone a childhood primary infection; but it would be unwise to assume that there is no difference in prognosis between these two types of disease. This factor may invalidate comparison between the results of treatment in unselected series of young adults now and those obtained in the past at a time when childhood infection was almost universal.

* The Lettsomian lectures for 1955, delivered at the Medical Society of London on April 18, 25, and 27. Lectures II and III will appear in later issues.

The Planning of Treatment

One of the chief difficulties in planning treatment for a patient with pulmonary tuberculosis now is the multiplicity of methods of treatment which are available. Of these, only antibacterial treatment has been the subject of investigations giving statistically valid results. About some other forms of treatment, there is sufficient evidence to convince the general body of experienced clinicians of their value, even though they have not been the subject of statistically satisfactory clinical trials; this group includes thoracoplasty and pulmonary resection. About others opinion has varied, and no general agreement has even yet been reached about such old-standing methods as artificial pneumothorax and pneumoperitoneum.

I think there are good reasons for the absence of valid statistical data about artificial pneumothorax and some other methods of treatment. Antibacterial treatment is applicable to all cases, and it was therefore possible to plan trials in which valid control groups were observed or in which patients were allocated randomly to two or more groups each to be treated in a predetermined way. With collapse therapy, and particularly with artificial pneumothorax, the situation is very different. Only a minority of cases would be regarded as suitable for artificial pneumothorax treatment, and among these a considerable number would be found, after the beginning of treatment, to present complications which would necessitate its abandonment. Hence the organisation of a controlled trial of this form of treatment was well-nigh impossible. Nevertheless, many critical observers were convinced of its value in cases in which it proved possible. This experience dates mainly from the time before antibacterial treatment was available.

The value of artificial pneumothorax in combination with antibacterial treatment has not been sufficiently explored and I think it is unfortunate that this method of treatment seems at present to be falling out of use in many centres. The variety of possible combinations of anatomical distribution and pathological type of lesions in pulmonary tuberculosis is so great that treatment must be individualised. The physician should keep in mind the potentialities of all feasible methods of treatment, and be eclectic in their use. In my view there is still a place for most of the methods of treatment which have been used successfully in the past, even though the indications may have changed and the number of cases to which some of them are now applied may have become smaller.

The Relevance of Morbid Anatomy

A firm understanding of the basic morbid anatomy of tuberculosis of the lungs is essential to the proper selection of methods of treatment. I have already spoken of the different reactions to tuberculous infection of the child (or of the adult of primitive race) and of the adult. In the following remarks I shall be referring to the pathological processes in the lungs of adults of European stock or of races having similar reactions to tuberculosis; and indeed, I shall not deal at all with the important problems of the management of tuberculosis in childhood.

The generalisation can be made that in adults active pulmonary tuberculosis denotes either tuberculous pneumonia or active tuberculous bronchitis. Both of these processes can resolve with the help of effective antibacterial treatment, or even, in favourable cases, by the unaided action of the patient's own defensive and reparative processes. In the most favourable cases, such resolution may be complete; a tuberculous pneumonia can resolve as completely as any other bacterial pneumonia, and a tuberculous bronchitis, provided there is no destruction of the bronchial wall, can similarly resolve and leave a normal bronchial lumen. But factors of two types militate against the cure of all cases of pulmonary tuberculosis by the natural defence processes of the body supported by sufficiently prolonged antibacterial treatment. They are, first, a group of mechanical factors; and, second, bacterial resistance to antibacterial agents. I shall consider the problems of bacterial resistance in the second lecture. Here I should like to discuss briefly some of the mechanical factors which may interfere with cure of the pulmonary tuberculosis by entirely conservative measures. The first lesion of pulmonary tuberculosis is, in nearly all cases, a localised tuberculous pneumonia. As soon as tubercle bacilli begin to escape from this tuberculous focus, transbronchial spread of bacilli to other parts of the lung may give rise to fresh pneumonic foci. However, even extensive pneumonic disease may undergo virtually complete resolution, provided the process of resolution starts early enough; the prompt application of antibacterial treatment is the best means we have of encouraging this favourable result.

A tuberculous pneumonia may fail to resolve, either because irreversible changes had occurred before treatment was started, or because response to treatment was delayed until such changes had occurred. These irreversible changes take the form of caseation, fibrosis, and persistent cavitation. Fibrosis, if not too extensive, is not of itself incompatible with effective clinical cure. Residual caseous foci sometimes, and persistent cavities nearly always, lead to failure to attain lasting clinical cure.

Residual caseous foci are compatible with long periods of good health, but constitute a potential danger of later reactivation of disease. The magnitude of this danger has been very differently estimated by different observers. Apparently-isolated caseous foci may be accompanied by adjacent small active lesions or by involvement of the bronchi of the sort which I shall discuss later. But even if there is no active disease of either of these sorts, and the caseous focus is indeed the only important site of disease, there are still two factors to be considered in assessing the probability of continued stability. The first is the efficiency of the fibrous-tissue capsule and of the occlusion of the bronchial communication of the focus. There seems to be no way in which clinical and radiological study on a single occasion can determine how secure is the encapsulation of a caseous focus. Frequently-repeated examinations of gastric contents or of laryngeal swabs for tubercle bacilli by culture, and serial radiography and tomography, provide the only information available to the clinician. Pathologically some caseous foci look secure enough; but in others there are weak points, especially at the site of the original bronchial communication, so that if the contents liquefy they can be discharged into the bronchial tree. Thus a solid focus becomes a cavity, and there is a risk of the spread of infection to other parts of the lungs. Here the second factor concerned in assessing the danger of solid caseous foci comes into consideration—the number and viability of bacilli in the walls and contents of the focus.

Several groups of workers have reported the failure of attempts to culture tubercle bacilli from residual caseous foci resected after long-continued antibacterial treatment (D'Esopo, Ryan, and Medlar 1951, D'Esopo, Bernstein, Decker, Raleigh, and Steenken 1953, Steele 1953, American Trudeau Society 1953), even though acid-fast rods may be shown to be present by microscopy. Whether such non-cultivable bacilli are truly dead or whether they are simply dormant and are capable of reactivation later has been argued inconclusively. However, it has recently been shown that special culture methods are successful in demonstrating bacilli in a considerable proportion of such encapsulated caseous foci, even after prolonged antibacterial treatment (Hobby, Auerbach, Lenert, Small, and Comer 1954). It therefore seems that these foci must in practice be

assumed to contain potentially active bacilli, and thus to constitute a possible source of reactivation of disease, whose importance can only be determined by continued observation of a large number of patients. Such caseous foci are in fact occasionally observed to cavitate, presumably by liquefaction and emptying of their caseous centres; the frequency of this event is difficult to estimate, but it probably happens rarely with smaller foci and with those in which calcification is evident.

It has become customary to accept some arbitrary size of residual caseous focus, for instance a diameter of 2 cm., as likely to constitute a danger serious enough to warrant resection; but this can be regarded only as a convenient rule of thumb. The incompleteness of our knowledge of these foci has been emphasised after a careful study by MacLeod and Tait Smith (1952).

The risk to a patient who has a non-cavitated caseous focus lies in the future rather than in the present. Persistent cavitation, however, constitutes an ever-present danger, both because of complications arising in the cavity itself, such as hæmoptysis and secondary infection, and because of the continued excretion of tubercle bacilli from the cavity, leading to danger of aspiration spread of tuberculosis to other parts of the lungs. Helm (1951) has shown that the location of fresh foci of disease in established cases of pulmonary tuberculosis can be related to the patient's sleeping posture; they appear with significant frequency in the lung which is dependent in the posture usually adopted for sleep. This suggests that transbronchial aspiration of infected secretions is an important factor in the spread of tuberculosis in the lungs. Though cavities may close on conservative treatment, only a minority, even of small or medium-sized cavities, will close in this way. Failure to close may be due to two factors. Firstly, if there is considerable destruction of lung tissue and fibrotic change in the remaining lung, it may be mechanically impossible for the remaining lung to over-distend sufficiently to permit closure of the cavity. Secondly, the bronchial pathway leading to the cavity may be so narrowed by tuberculous changes, by kinking or by both these factors, that it constitutes a valve, permitting ingress of air during inspiration but obstructing its egress during expiration. Although a cavity may occasionally be sterilised of tubercle bacilli by sufficiently prolonged antibacterial treatment, this must be a rare event, and one which will necessitate a very long period of treatment; moreover, as I shall show in the next lecture, the presence of considerable and persistent cavities is one of the factors associated with the emergence of strains of tubercle bacilli resistant to the antibacterial drugs.

The mechanical effects of bronchial tuberculosis which may prevent the healing of pulmonary tuberculosis are those produced by stenosis at the site of severe bronchial tuberculosis, and by bronchial dilatation. The frequency of involvement of the bronchi in tuberculosis of the lower respiratory tract, and its importance in the pathogenesis of the disease have been increasingly recognised in the past few years. It has been discussed by Sayé (1951) and by Clegg (1953). The bronchi are of necessity involved locally in any form of pulmonary tuberculosis. I have already mentioned one of the consequences of such local disease—the possible development of tension cavities. Sometimes, either from a focus of tuberculous pneumonia or from invasion of the bronchial wall by erosion from a tuberculous bronchopulmonary lymph-node, tuberculosis spreads progressively in the bronchial mucosa. Histologically, tubercles are frequently found spreading in a macroscopically normal mucosa to a considerable distance from a grossly visible focus of tuberculosis. It seems that when latent changes of this sort become overt, they may manifest themselves in several ways. They may give rise to local ulceration and later stenosis of large bronchi related to a focus of disease in the lung. Less frequently there may be a diffuse involvement of the bronchi in gross tuberculosis.

An important consequence of tuberculosis affecting predominantly the bronchi of an isolated segment or subsegment is the type of lesion which has been called by Clegg a bronchial cold abscess. In this, there is a mass of caseous material of irregular shape, sometimes pyriform or fusiform, and sometimes with central softening; its walls show evidence that they are composed of remnants of bronchial structures disorganised by tuberculosis, in direct continuity with a bronchus also affected by tuberculosis; and it seems clear that the caseous lesion developed as the result of severe involvement of the bronchi, with accumulation of caseous material beyond a local stenosis. A lesion of this sort may be the end-result of tuberculous infiltration in the bronchial mucosa, either towards the hilum from a focus of caseous pneumonia, or peripherally from the bronchopulmonary lymph-node component of a primary complex. It may be impossible to determine by which of these two routes the lesion originated, and it seems likely that in different populations the frequency of the two origins is different. A bronchial cold abscess is often detectable, or at least can be suspected, radiologically, showing especially in tomograms a pyriform shape with the stalk-like shadow of a thickened bronchus connecting it to the hilum. Recognition is important, since this type of lesion is very apt to break down periodically, and conservative treatment is usually unsatisfactory.

Stenosis of larger bronchi gives rise to bronchiectasis, from retention of secretions and damage to the distal bronchial wall; secondary infection may follow, leading to complete destruction of the normal architecture of the distal part of the lung, with mixed tuberculous and pyogenic infection of a mass of tuberculous and bronchiectatic cavities. This type of disorganised bronchiectatic lung distal to a stenosis must be distinguished from three other types of bronchiectasis associated with tuberculosis. The first is the rare true tuberculous bronchiectasis, in which the main brunt of the tuberculous disease is on the bronchial mucosa, with relatively little pulmonary disease. The second is bronchiectasis, not in itself tuberculous, secondary to bronchostenosis due to involvement of a lobar or segmental bronchus by local ulceration of the lymph-node component of a primary tuberculous infection. This, as pointed out by Brock (1950), is especially frequent in the right middle lobe, the right cardiac segment, and the anterior segments of the upper lobes. The third is the non-tuberculous bronchiectasis consequent upon the healing, with fibrosis, of extensive tuberculous disease of the lungs. This is seen most often in the upper lobes. These two latter types—those secondary to bronchostenosis due to now healed primary tuberculosis, and to the healing of extensive pulmonary tuberculosis—are late consequences of healed tuberculosis and therefore do not enter into our present consideration of the mechanical effects of bronchial disease on the evolution of pulmonary tuberculosis. Their treatment should be decided in the light of the symptoms which they actually produce. Stenosis of bronchi in the presence of active bronchopulmonary tuberculosis and true tuberculous bronchiectasis do, on the other hand, affect profoundly the indications for treatment, since a patient with either of these is unlikely to attain bacteriological cure of tuberculosis unless resection of the affected bronchopulmonary segments, lobe, or lung is possible.

Conclusion

It is clear that these facts of morbid anatomy have important practical consequences. The situation is complicated by the limitation sometimes imposed upon the effectiveness of antibacterial drugs by the emergence of resistant bacilli, which tends especially to arise in patients with the most extensive and active disease. This subject I shall discuss in the next lecture. We have

gone far enough, however, to see that even with the most effective antibacterial treatment we are likely to be left with a number of problems which can only be solved by other methods. These include residual encapsulated caseous foci, persistent cavities, bronchial stenoses, widespread tuberculous bronchiectasis, and bronchial cold abscesses. Medical and surgical collapse therapy and surgical resection of lung are required for the treatment of these; and, in some circumstances, in order to prevent or forestall the development of some of them. I shall consider these measures later.

In concluding this lecture, I shall refer briefly to the difficulty of deciding about the treatment of the individual on the basis of knowledge much of which is statistical. Variations in individual reactions to pulmonary tuberculosis of apparently similar type and extent soon become apparent to any observer. These were perhaps more obvious before antibacterial agents were available. Sometimes the most unpromising-looking patients unexpectedly recovered from extensive disease. On the other hand, some patients who started with minimal disease and no apparent unfavourable factors nevertheless deteriorated, with setback after setback, in spite of the best available management. Other patients seemed to go through bad and good phases, so that after a period of perhaps years, with recurrent setbacks, they entered a more stable phase and eventually attained arrest of their disease.

Although these variations in individual reaction to the disease may be less obvious now, they are still of very great importance. The response of patients to antibacterial treatment is far from predictable, and the patient's resistance to tuberculosis is an important factor in determining the response to antibacterial drugs, including the rate of emergence of resistant bacilli. Antibacterial drugs shift the whole range of response to treatment in the direction of improvement, but the range remains wide. It is because of these individual variations that new drugs and methods in the treatment of pulmonary tuberculosis are so difficult to assess, and require for valid scientific assessment somewhat artificial trials based upon the observation of groups of patients with a specified type of disease, allocated at random to different treatments after acceptance as suitable for the trial.

The physician charged with advising treatment for the individual must take into consideration the special circumstances of each patient. He will consider anything relevant to the assessment of the patient's resistance to the disease in his personal and family history, in his physical habitus, and in his psychological make-up. An initial period of observation is an important help in this assessment; in cases of active disease, this will include the observation of the initial response to treatment by rest and antibacterial drugs. The patient's economic and social environment will very properly affect some decisions about treatment. It is the physician's duty to consider these imponderable factors as well as the facts of morbid anatomy and the results of statistically controlled therapeutic trials.

". . . There is a widespread feeling, expressed often in conversation but seldom in print, that popular or semi-popular writing is an activity which should be indulged in only when the age of useful work is past. Not surprisingly, it does so happen that some of the best writing is done by those whose reputations are already made, who have learnt from teaching how little can be absorbed in one session, and who have suffered at meetings from those who proceed remorselessly with every last detail but omit any clear explanation of the main point. It is an illusion that there is any clear distinction between ability to explain at one level and ability to explain at another. There are merely those who can explain, and will, and those who cannot, or will not. Members of the second group are in the majority. They are dependent on the first group for the means to conduct research; since, unless its scope and purpose can be conveyed, means for its support will be lacking."—*Science News*, editorial, p. 8.

ABO BLOOD-GROUPS AND GASTRIC ACIDITY

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IN 1953 Aird et al. demonstrated an association between the ABO blood-groups and cancer of the stomach, group A being significantly commoner in patients with this disease than in controls drawn from the same hospitals. Aird et al. (1954) subsequently described an increased frequency of blood-group O in patients with peptic ulcer, compared with controls.

We have compared the distribution of ABO blood-groups in patients with carcinoma of the stomach, gastric ulcer, or duodenal ulcer with the distribution in healthy persons living in the same locality.

Previous Reports

GASTRIC ACIDITY

The secretion of acid by the normal stomach and in the presence of gastric carcinoma or peptic ulceration has been thoroughly studied; but the figures for output of hydrochloric acid are difficult to compare, since the range of variation is very wide and results are expressed differently. The output of acid diminishes with age (Polland 1933). Women with peptic ulceration have a lower level of gastric acidity than men (Perman 1936).

From our own observations and from previous reports—notably by Polland (1933), Bloomfield et al. (1940), Roth et al. (1944), and Ihre (1948)—we conclude that the amount of free acid in the stomach ranges from the highest to the lowest values as follows: duodenal ulcer, gastric ulcer, normal, cancer of the stomach with free acid, cancer of the stomach with achlorhydria (fig. 1).

BLOOD-GROUPS

Carcinoma of the Stomach

In 1926 Johannsen, of Copenhagen, collected 348 cases of cancer in different organs, including 14 cases of gastric cancer. In the whole series the frequency of blood-group A was 6·9% greater than in 533 normal controls. Most other attempts to establish a connection between blood-groups and cancer (Alexander 1921, Hoche and Moritsch 1926)

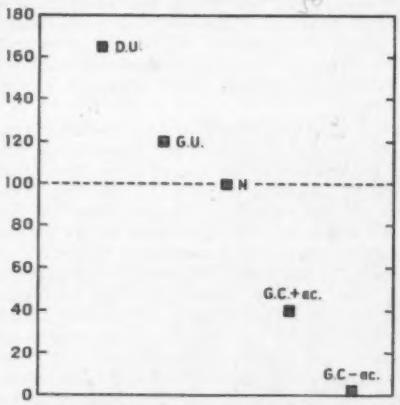

Fig. 1—Relative total hydrochloric acid output in five different conditions of the stomach and duodenum. D.U. = duodenal ulcer. G.U. = gastric ulcer. N = normals. G.C. + ac. = gastric carcinoma without achlorhydria. G.C. − ac. = gastric carcinoma with achlorhydria. In the scale 100 represents the value for healthy people aged 20–29. (The estimates for duodenal ulcer, gastric ulcer, and normal are derived from Polland 1933 and Roth et al. 1944. The estimates for gastric carcinoma with and without free acid in the stomach are derived from the present series.)

TABLE I—DISTRIBUTION OF BLOOD-GROUPS AMONG REPORTED CASES OF CANCER OF THE STOMACH

Source	Total no. of patients	O (%)*	A (%)*	B (%)*	AB (%)*
Aird et al. (1953)	3632	44·5 (*−4·1*)	44·8 (*+5·0*)	7·8 (*−0·5*)	2·9 (*−0·3*)
Hollander (1953)	704	36·2 (*−5·4*)	53·1 (*+8·0*)	7·5 (*−1·5*)	3·1 (*−1·1*)

* Difference from controls in parentheses.

yielded inconsistent results, partly owing to inadequate controls. But Aird et al. (1953) showed, in a very large series of cases, that the frequency of blood-group A was distinctly increased in cases of carcinoma of the stomach, and that the frequency of blood-group O was correspondingly lower. Holländer, of Basle (cited by Aird et al. 1953), also found an increased frequency of blood-group A in 704 cases of cancer of the stomach (table I).

Peptic Ulcer

Buchanan and Higley (1921) first studied the distribution of blood-groups in patients with peptic ulcer. In a rather mixed group of 172 cases, including besides cases of peptic ulcer some of ulcerative colitis, they found a group-O frequency of 59%, compared with 43% in the original normal series of Moss (1909).

In 3011 patients with peptic ulcer Aird et al. (1954) clearly demonstrated an increased frequency of blood-group O and a decreased frequency of group A, compared with the normal population. The results of these workers and of Clarke (1955) are summarised in table II.

Other Conditions with Abnormal Gastric Secretion

Buchanan and Higley (1921) found that among 457 cases of pernicious anæmia 44·2% had blood-group A

TABLE II—DISTRIBUTION OF BLOOD-GROUPS AMONG REPORTED CASES OF PEPTIC ULCER

Source	Total no. of patients	O (%)*	A (%)*	B (%)*	AB (%)*
Buchanan and Higley (1921)	172	59 (*+16*)	32 (*−8*)	5 (*−5*)	4 (*−3*)
Aird et al. (1954)	3011	55·4 (*+8·4*)	34·7 (*−6·3*)	7·4 (*−1·5*)	2·5 (*−1·5*)
Clarke (1955)	1497	59·6† (*+10·5*)	29† (*−11·9*)	..	..

* Difference from controls in parentheses.
† Duodenal ulcer only.

and 41·4% blood-group O, compared with 40% with group A and 43% with group B in Moss's (1909) series. But the two series are hardly comparable, and Buchanan and Higley conclude: "The percentages, although at slight variance with the original percentages of Moss, demonstrate that the causal factor in pernicious anæmia has no relation to blood-grouping.

R. B. McConnell (cited by Clarke 1955) has demonstrated an increased frequency of blood-group A in diabetics, who seldom have duodenal ulcer and commonly have achlorhydria.

Neoplasms Elsewhere in the Alimentary Tract

In patients with carcinoma of the colon or rectum the distribution of the ABO blood-groups is normal (Aird et al. 1954).

Material

In our department since 1947 all patients have been subjected routinely to blood-grouping, at first by the State Serum Institute and since 1951 by the hospital blood-bank. The following data relate to patients admitted between 1947 and the end of 1954.

Carcinoma of the Stomach

420 patients with gastric carcinoma were admitted between 1947 and the end of 1954. Of these, 321 were transferred from medical departments, and 99 were direct admissions. This series is probably representative of all patients with cancer of the stomach.

373 patients underwent operation, and 47 were regarded as inoperable. Of these 47, 46 have died; 18 of these patients died in hospital, and necropsy was done in each case.

Thus in 391 cases the diagnosis was confirmed microscopically. Clinically there was no doubt about the diagnosis of gastric carcinoma in the remaining 29 cases.

In 7 cases where the patient was admitted in extremis the blood-group was not established. There are thus 413 cases in which the blood-group is known.

Peptic Ulcer

We have taken 1047 consecutive cases in which the diagnosis of peptic ulcer was confirmed at operation.

TABLE III—DISTRIBUTION OF BLOOD-GROUPS AMONG 14,304 HEALTHY PEOPLE IN COPENHAGEN (BRYDE ANDERSEN 1955)

—	O	A	B	AB
No.	5804	6299	1557	644
% of total ..	40·6	44·0	10·9	4·5

Cases in which no ulcer was found at operation are excluded. Most of these patients were transferred from medical departments, having had one or more courses of medical treatment.

Of the 1047 patients 680 were found to have a duodenal ulcer, 337 gastric ulcer, and 30 both gastric and duodenal ulcers. The ABO blood-group was investigated in every case.

This series, since it does not include cases treated throughout by medical methods alone, is not representative of all cases of peptic ulceration.

Pernicious Anæmia

From three medical departments records of some 500 cases of pernicious anæmia were collected; but only the more severely ill patients had been blood-grouped.

Controls

In the early months of this year Bryde Andersen (1955) studied the distribution of blood-groups in Copenhagen. He selected 14,304 registrations of persons, aged 15–70, whose blood-group had been examined in the hospital blood-bank. These persons were: (1) patients' relatives;

TABLE IV—DISTRIBUTION OF BLOOD-GROUPS AMONG 413 PATIENTS WITH CANCER OF STOMACH

Year	Total	O		A		B		AB	
		No.	%*	No.	%*	No.	%*	No.	%*
1947	35	12	34·3	15	42·8	7	20·0	1	2·9
1948	51	19	37·4	26	51·0	4	7·8	2	3·8
1949	38	9	23·7	24	63·1	3	7·9	2	5·3
1950	49	18	36·7	25	51·0	6	12·3	0	..
1951	67	25	37·3	35	52·2	3	4·5	4	6·0
1952	48	17	35·4	27	56·3	4	8·3	0	..
1953	62	23	37·1	31	50·0	5	8·1	3	4·8
1954	63	18	28·5	29	46·0	12	19·1	4	6·4
1947–54	413	141	34·1 (*−6·5*)	212	51·3 (*+7·3*)	44	10·7 (*−0·2*)	16	3·9 (*−0·6*)

* Difference from controls in parentheses.

TABLE V—DISTRIBUTION OF BLOOD-GROUPS AMONG 413 PATIENTS WITH CANCER OF STOMACH CLASSIFIED ACCORDING TO THE PRESENCE OR ABSENCE OF FREE ACID IN THE STOMACH

Free acid	Total	O		A		B		AB	
		No.	%*	No.	%*	No.	%*	No	%*
Present ..	106	38	35·9	51	48·1	13	12·3	4	3·7
Absent ..	195	65	33·2	110	56·4	13	6·7	7	3·6
Unexamined	112	38	34·2	51	46·0	18	16·2	5	4·5
Total ..	413	141	34·1 (−6·5)	212	51·3 (+7·3)	44	10·7 (−0·2)	16	3·9 (−0·6)

* Difference from controls in parentheses.

(2) volunteer blood-donors, unrelated to patients; (3) groups of factory workers; and (4) platoons or companies of soldiers, often comrades of patients in the hospital. No patients are included in this control group.

These 14,304 persons represent a cross-section of the healthy population between 15 and 70 years of age in Copenhagen, where all our patients live. People over 70 (amounting to 6% of the inhabitants and a higher proportion of our patients) are not represented in the control group.

Table III shows the distribution of ABO blood-groups in the controls.

Findings

Carcinoma of the Stomach

The distribution of ABO blood-groups in the 413 patients is shown in table IV.

The relative excess of group A is clear, and the relative scarcity of group O is even more pronounced. 51·3% of the patients were of group A, compared with 44·0% of the controls—an excess of 7·3%.

TABLE VI—DISTRIBUTION OF BLOOD-GROUPS AMONG 1047 CASES OF PEPTIC ULCER

Type of ulcer	Total	O		A		B		AB	
		No.	%*	No.	%*	No.	%*	No	%*
Duodenal	680	342	50·2	261	38·4	60	8·8	17	2·5
Gastric ..	337	156	46·3	139	41·4	28	8·3	14	4·1
Duodenal+gastric	30	13	43·3	11	36·6	4	13·3	2	6·7
All ..	1047	511	48·7 (+8·1)	411	39·3 (−4·7)	92	8·8 (−2·1)	33	3·1 (−1·4)

* Difference from controls in parentheses.

The presence of free hydrochloric acid in the stomach was investigated in 301 patients. Where two Ewald test-meals showed achlorhydria the presence of free acid was investigated by a histamine or insulin test. 195 were found to be achlorhydric, while in 106 free hydrochloric acid was detected.

Table V shows that in the achlorhydric group the frequency of blood-group A is very high (56·4%) and of group O correspondingly low (33·2%). The distribution of blood-groups B and AB fluctuates rather irregularly, but the over-all deviations from the frequency in the controls is only slight.

Peptic Ulcer

The blood-groups of the 1047 patients with proved peptic ulcer are recorded in table VI. The frequency of blood-group A is 39·3%, compared with 44·0% in the controls and 56·4% in the patients with gastric cancer and achlorhydria. The frequency of groups A and AB is also lowered, and this deficit is fully accounted for by the increase in blood-group O to 48·7% (compared with 40·6% in the controls).

Table VI also reveals a considerably greater prevalence of group O in patients with duodenal ulcer than in patients with gastric ulcer (50·2%, compared with 46·3%) and a corresponding fall in group A. Again, groups B and AB fluctuate, but over-all their relative frequency is definitely reduced.

Pernicious Anæmia

The figures for the 111 patients are shown in table VII.

In 10 of these cases carcinoma of the stomach developed. The blood-groups in these 10 cases were as follows: group O, 4; group A, 1; group B, 3; group AB, 1; not examined, 1. These small numbers are inadequate for analysis, but they are mentioned so that they may be added to those recorded by others.

BLOOD-GROUPS AND GASTRIC ACIDITY

This study has revealed an inverse relation between the frequency of blood-groups O and A in patients with gastric and duodenal lesions. Fig. 2 shows that the shift from conditions associated with the least production of hydrochloric acid to conditions associated with the greatest production of acid is accompanied by an increasing frequency of blood-group O and a decreasing frequency of blood-group A.

TABLE VII—DISTRIBUTION OF BLOOD-GROUPS AMONG 111 CASES OF PERNICIOUS ANÆMIA

O		A		B		AB	
No.	%*	No.	%*	No.	%*	No.	%*
44	39·8 (−0·8)	47	42·3 (−1·7)	14	12·6 (+1·7)	6	5·3 (+0·8)

* Difference from controls in parentheses.

The results of previous work in this field are not easily compared with the present results, since the distribution of ABO blood-groups varies considerably between one place and another, even in a single country. Fig. 3 shows the percentage differences between the blood-group frequencies in patients and the related control series, drawn from the results of Aird et al. (1953, 1954), Holländer (Aird et al. 1953), and Clarke (1955). These differences accord with our results, and with the variations in gastric acidity expressed in fig. 1.

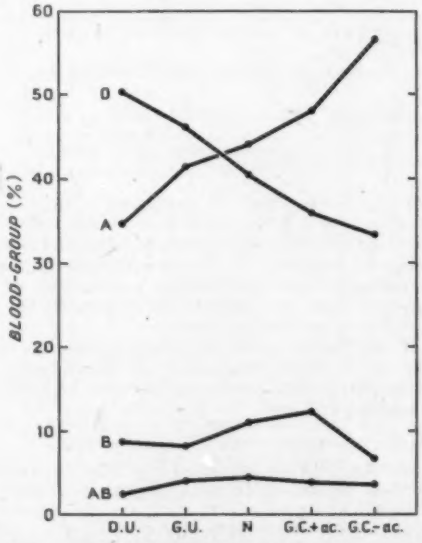

Fig. 3—Frequency of blood-groups O, A, B, and AB in five different conditions of the stomach and duodenum arranged in order according to the output of gastric acid. Abbreviations as for fig. 1.

TABLE VIII—DISTRIBUTION OF BLOOD-GROUPS IN TWO SERIES OF HEALTHY PEOPLE IN COPENHAGEN: (1) AGED 65–102 (THOMSEN 1927), AND (2) AGED 15–70 (BRYDE ANDERSEN 1955)

Age-range	Total no.	O (%)	A (%)	B (%)	AB (%)
65–102(1927)	609	44·0	42·0	9·2	4·8
15–70 (1955)	14,304	40·6	44·0	10·9	4·5

Discussion

Studies of the relative frequency of blood-groups in certain disorders are usually based on comparison with the frequency in the general population of the locality.

The control series in Aird et al.'s (1953) work on blood-groups in gastric carcinoma consists of "equal numbers of patients chosen at random"; and in the subsequent work on blood-groups in peptic ulcer (Aird et al. 1954) 10,000 pregnant women were included in the control series. Neither of these control series can be said to be representative of the general population (Allan 1954); and in their second report Aird et al. point out that the great number of patients with peptic ulcer in hospitals may influence the distribution of blood-groups among their controls in favour of group O. Furthermore, "equal numbers" must be regarded as numerically insufficient when only about 100 cases are being considered, as in the Birmingham and Newcastle groups of cases of gastric carcinoma reviewed by Aird et al. (1953).

Our different groups of patients with gastric diseases may not be strictly comparable with the general population represented by Bryde Andersen's figures (table III). This control series has not yet been classified with regard to age, sex, social class, and marital status. Although unlikely, such classification might reveal possibly important discrepancies between controls and patients.

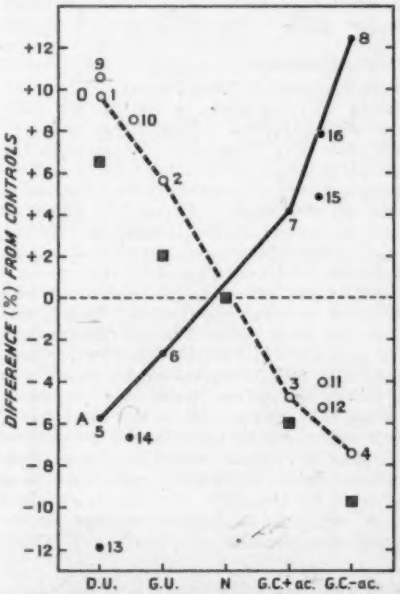

Fig. 3—Differences between percentage frequency of blood-groups O and A in gastric and duodenal diseases and in the appropriate control series. Numbers 1–8 represent values found in the present series (tables V and VI). Numbers 9–16 represent values found by previous investigators: 9, duodenal ulcers (Clarke 1955); 10, all ulcers (Aird et al. 1954); 11, cancer of stomach (Aird et al. 1953); 12, cancer of stomach (Holländer 1953); 13, duodenal ulcers (Clarke 1955); 14, all ulcers (Aird et al. 1954); 15, cancer of stomach (Aird et al. 1953); 16, cancer of stomach (Holländer 1953). Black squares signify gastric acid output (for scale see fig. 1). Abbreviations as for fig. 1.

One thing is certain: patients with gastric carcinoma are on the whole older than patients with gastric ulcer, and older than our controls in whom 70 years is the upper limit. Thomsen (1927) suggested that the distribution of blood-groups changed with increasing age. But comparison of Thomsen's figures for healthy people aged 65–102 in Copenhagen with those of Andersen for healthy people aged 15–70, also in Copenhagen, shows no significant differences (table VIII).

Further classification of our controls and cases may throw some light on the occurrence of gastric cancer in different social classes and occupations (Stocks 1950) and on the problems raised by Hansen's (1943) investigations into the incidence and character of peptic ulceration. Hansen has demonstrated a profound change in the character of peptic ulcer in the past forty years—from predominance of gastric ulcer in young women to predominance of duodenal ulcer in young men and of gastric ulcer in both sexes at a higher age than formerly. This change, which is probably still continuing, may be found to be reflected in the distribution of blood-groups, when it is possible to compare duodenal and gastric ulcer patients with the controls with due regard to age, sex, occupation, and marital status.

The study of the distribution of blood-groups in patients with achlorhydria not caused by cancer should be continued. This is probably of great importance since Mosbech and Videbæk (1950) have shown that pernicious anæmia predisposes to gastric carcinoma. These workers suggest that achlorhydria may be hereditarily conditioned and may predispose to both diseases; and so it might be expected that the same increased frequency of blood-group A would be found in cases of pernicious anæmia as has been found in cases of carcinoma of the stomach—most strikingly where this is associated with achlorhydria.

Patients with gastric carcinoma and blood-group A are now being examined with regard to groups A_1 and A_2 and the secretion of group-A substance. But this investigation is progressing slowly since only a few of the patients are available.

Summary

The ABO blood-groups have been investigated in 680 cases of duodenal ulcer, 337 cases of gastric ulcer, 106 cases of gastric carcinoma associated with free hydrochloric acid in the stomach, and 195 cases of gastric carcinoma associated with achlorhydria. The controls were 14,304 healthy people from the same locality.

The patients with duodenal ulcer, in whom the secretion of hydrochloric acid was greatest, included 50·2% with group O and 38·4% with group A.

In patients with gastric carcinoma associated with achlorhydria 33·2% were of group O, and 56·4% were of group A.

The frequency of blood-groups B and AB was not similarly reversed.

This work has been aided by a grant from the P. Carl Petersen Foundation, Copenhagen.

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THE SIGNIFICANCE OF CLINICAL TESTS OF PASSIVE JOINT SENSE

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A STANDARD and easily performed test for the quantitative assessment of sensation in a patient would be of great value in indicating the progress of nerve lesions. In an attempt to establish such a test an investigation was carried out into the reliability of passive proprioceptive sense at the first metatarsophalangeal joint, and into the range of movement necessary before displacement of the toe was appreciated with certainty. The results of this investigation have been described elsewhere (Browne, Lee, and Ring 1954). The purpose of the present paper is to call attention to certain facts which became clear during the course of this investigation and which appeared to have an important bearing on the assessment of passive joint sense as ordinarily carried out in clinical practice.

Experimental Procedure

The details of the method are described in the paper already quoted. The metatarsophalangeal joint was moved by an electric motor at speeds of rotation of 1° and 2° per sec. The angle of rotation that was necessary to evoke the sensation of movement was graphically recorded.

Proprioception in Normal Subjects

The most important fact which emerged from this investigation was the extreme lack of sensitivity of passive joint sense. In a widely used textbook of clinical method (Hutchison and Hunter 1949) it is stated that an angle of 3° should not be exceeded before passive movement is appreciated. In our original investigation, however, the mean angle at which appreciation was registered was 4·4°, and in 10 out of 82 subjects the angle was more than 15°. In 3 subjects regularly, and in others occasionally, no movement was felt until an angle of more than 20° downwards had been traversed. This is close to the limit of downward movement in the first metatarsophalangeal joint, even in young subjects, and with so great a displacement considerable distortion of the surrounding soft tissue inevitably takes place, introducing extra-articular sensations. It is therefore impossible to be certain that even at this displacement these subjects were actually experiencing proprioceptive sensation.

Methods of Clinical Assessment

It may reasonably be asked why, if joint sense is absent or so much impaired in such a high proportion of normal subjects, testing for this sensation has been retained as part of a clinical examination. Four points in particular merit criticism, namely: the method of gripping the toe; the large angle through which the toe is moved; the mode of questioning (which even with pure guesswork on the part of the patient may produce correct answers on 50% of occasions); and the failure to distinguish between the appreciation of active and passive movement.

Textbooks of clinical method recommend that the toe should be grasped at the sides in order to prevent the subject from guessing at movement by appreciating pressure applied in an upward and downward direction. But this is a misapprehension; if the toe is grasped at the sides some distortion of the skin must take place when the toe is moved, and the subject may be able to judge movement from this distortion. If, however, the toe is grasped firmly on the dorsal and ventral aspects the additional pressure on one surface required to move the toe is very small in comparison with the already existing pressure and cannot be detected. The importance of this factor was shown by a patient suffering from tabes dorsalis. When the big toe was gripped at the sides he appeared to have normal joint sense but careful questioning elicited the fact that the patient was assessing movement by skin distortion and that this could be abolished by gripping firmly plantar and dorsal surfaces.

Probably more important than the method of gripping the toe is the angle through which the toe is moved. This angle may be so great that there is considerable distortion of tissues other than those directly involved in registering sensation of passive movement, and such distortion may be more than sufficient to indicate the correct direction.

The third criticism concerns the mode of questioning. It is sometimes suggested that sense of position and passive movement should be tested separately. In practice, however, the toe is usually moved quickly either up or down several times and left in a position which the patient is asked to identify. It is probably justifiable to apply a single test to cover these two sensations since it has been shown by several workers (e.g., Boyd and Roberts 1953) that in the cat certain nerve-endings are capable of giving information on both position and movement, and previous work (Browne et al. 1954) suggests that no distinction can be made in man. But any test which seeks to elicit an answer from two simple alternatives suffers from the disadvantage that if subjects give positive answers even when unable to sense (as they sometimes may) they will still appear on the average to judge correctly on 50% of occasions.

Finally, the significance of the distinction between active and passive proprioception is not always fully appreciated in clinical practice. Appreciation of active joint sense takes place only when there is tension in the muscles and tendons passing over that joint, while passive joint sense is the sole source of proprioceptive information under conditions of relaxation. These two types of joint sense appear to depend on the activity of different afferent fibres and differ also in their functional importance. Experimental evidence suggesting that passive proprioception originated in the capsule, and was therefore dependent upon its anatomical configuration, has been given by Lee and Ring (1954). Clinical observations carried out later appeared to confirm this view; where the capsule of the metatarsophalangeal joint was shortened, as in hallux rigidus, the patient was frequently aware of very small movements, and on the other hand, where the capsule was unusually lax, considerable passive movement took place before the sensation was evoked. The relative unimportance of passive joint sense was clearly demonstrated by the gross movements required to elicit it in our subjects, in marked contrast to the delicacy of perception normally associated with active joint sense.

These differences were both well exemplified by one subject who, on testing, was found to have an abnormally wide range of movement in most of the peripheral joints, which may be taken as evidence of unusual laxity of the joint capsules. With this laxity there was gross disturbance of appreciation of passive movement of all the peripheral joints, but appreciation of active movement was unimpaired. The subject was unaware of this defect, which carried no apparent disability.

An interesting phenomenon observed in many subjects with poor appreciation of passive sense was a "hunting" movement of the great toe. In these people the instruction to prepare to sense movement in the great toe caused alternating increases of tone in the flexors and

extensors of the toe, often producing perceptible small movements up or down, probably in an effort to utilise active joint sense to compensate for the failure to appreciate passive movement.

These observations indicate that impairment of passive joint sense is of little practical importance to the individual. In the course of a neurological lesion it is the loss of active joint sense which results in functional disability. Lesions of the posterior columns of the spinal cord may produce loss of both these modes of sensation, together with blunting of tactile discrimination, and it is the loss of all three (particularly perhaps the last) which causes inability to respond in the ordinary clinical test of passive movement in the great toe.

Conclusions

Clinical testing of appreciation of passive movement of the great toe, when carefully performed, may demonstrate impairment to which no pathological significance can be attached. On the other hand, in patients with known lesions of the central or peripheral nervous system, clinical testing as ordinarily performed may suggest the presence of normal sensation even when this is impaired or absent. It would therefore appear that testing passive joint sense at the metatarsophalangeal joint gives no reliable evidence of neurological changes.

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SMEARS FROM THE ORAL MUCOSA IN THE DETECTION OF CHROMOSOMAL SEX

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THE skin-biopsy test of chromosomal sex is being used with increasing frequency as an aid to differential diagnosis in errors of sex development, such as hermaphroditism and gonadal dysgenesis (Moore et al. 1953, Barr 1954, 1955, Marberger and Nelson 1954, Polani et al. 1954, Wilkins et al. 1954, Bromwich 1955, Ehrengut 1955, Grumbach et al. 1955, Sohval et al. 1955). The epidermal nuclei of females contain a mass of sex chromatin that is inconspicuous in nuclei of males (Moore et al. 1953, Emery and McMillan 1954). The nuclei of epidermis are similar to those of other human tissues in this respect (Moore and Barr 1954). A sex difference in nuclear morphology has been found in several other mammals (Barr et al. 1950, Graham and Barr 1952, Moore and Barr 1953, Prince et al. 1955). The sex chromatin of female cells is thought to be formed by heterochromatic portions of the two X chromosomes adhering to each other in intermitotic nuclei. For reasons that are only partly understood, the XY sex-chromosomes of male nuclei do not form a distinctive mass of chromatin.

In our experience, the skin-biopsy test is reliable if the sections are of good technical quality. Experience has also shown, however, that difficulty is sometimes encountered in obtaining sections that display fine nuclear detail. The use of smears from the oral mucosa has been investigated in the hope of simplifying the cytological detection of chromosomal sex.

Procedure

In 140 subjects (81 males and 59 females) the mucosa of the cheek was rubbed firmly with the edge of a wooden tongue depressor. The material obtained was smeared gently on microscopic slides that had been coated with a thin film of Mayer's egg-albumin. 13 of the smears were from infants aged 2–7 days; the ages of the other subjects ranged from 2 months to 62 years. The Ayre spatula was a useful substitute for a tongue depressor when dealing with infants.

The slides were immersed immediately in Papanicolaou's fixative (equal parts 95% ethyl alcohol and ether). Drying of the smear was avoided. The period of fixation was not critical; times of from two to twenty-four hours were satisfactory. The fixed smears were passed through 70% alcohol, 50% alcohol, and distilled water, five minutes in each, with two changes of distilled water.

The following staining procedure resulted in good nuclear detail:

(1) Staining in a 1% solution of cresyl echt violet (Coleman and Bell) for five minutes.

(2) Differentiation in 95% alcohol (two changes) for about five minutes.

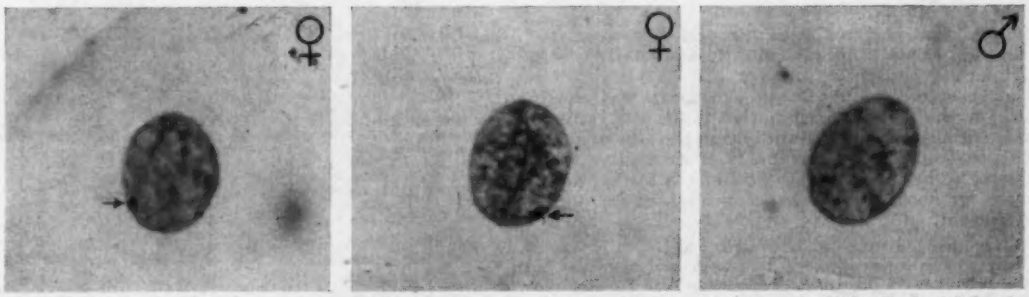
(3) Further differentiation in absolute alcohol, checking at intervals with the microscope until the details of cell structure were sharply defined.

(4) Clearing in xylene (two changes).

(5) Mounting in picolyte or neutral balsam.

Some smears were stained by the Feulgen method for desoxyribose nucleic acid.

If the slides are to be mailed to a laboratory for staining and microscopic study they should be transferred from distilled water to a 15% solution of glycerin in water for about two minutes. The excess solution is drained off. This treatment protects the smears from drying while in transit. The slides should be washed free of glycerin with distilled water before the smears are stained. The procedure of Ayre and Dakin (1946) for cervical smears may be used.



Figs. 1–3—Epithelial cells, stained with cresyl echt violet, in smears from the oral mucous membrane (× 2000). Fig. 1, adult female. Fig. 2, female infant, aged 2 days. Fig. 3, adult male.

Observations

Each of us examined independently the series of 140 smears without reference to the sex of the subjects. The sex was correctly diagnosed in 100% of cases by both examiners.

Males

The appearance of the nuclei varied from cell to cell, and to some extent from one smear to another. As expected, some nuclei were shrunken and pyknotic and unsuitable for study. In other nuclei, however, the general chromatin was distributed evenly as small particles throughout the nucleoplasm, with a predilection for the inner surface of the nuclear membrane. One or more irregular clumps of chromatin of larger size were seen in various positions within the nucleus in some cells. Nucleoli were inconspicuous. An epithelial cell characteristic of smears from males is illustrated in fig. 3.

Females

The typical female-sex chromatin was a feature of many nuclei. The intensity of staining and sharpness of outline of the sex chromatin varied from cell to cell. The sex chromatin was located in various positions in relation to the periphery of the nucleus as seen in optical section. It was most definite and easiest to recognise when at the periphery of the nucleus, as illustrated in figs. 1 and 2. The sex chromatin was identified in this location in 40–60% of nuclei that were suitable for the study of morphological detail. A roughly planoconvex shape was most characteristic, the more flattened surface being adherent to the inner surface of the nuclear membrane. In some cells the sex chromatin was very much flattened, appearing as a local thickening of the nuclear membrane. Other shapes were encountered. The sex chromatin was Feulgen-positive. Measurements of a hundred masses of sex chromatin (ten cells in ten smears) with a filar micrometer eyepiece produced a mean value of $0{\cdot}7 \times 1{\cdot}2\ \mu$. Moore and Barr (1955) found that the average size of the female-sex chromatin was $0{\cdot}7 \times 1{\cdot}2\ \mu$ in sections of several human tissues.

Discussion

We believe that, with reasonable care, chromosomal sex can be diagnosed from smears of oral mucosa with very little chance of error. The preparation of mucosal smears has the advantage over skin biopsies of simplicity. On the whole, smear preparations are easier than skin biopsies to interpret, and they require less experience in cytology. Further smears can be easily obtained from a patient if the first preparations are technically unsatisfactory, and smears can be prepared in the rare instances where permission for a skin biopsy is refused. The mucosal-smear method of detecting chromosomal sex is suggested, therefore, as an alternative to skin biopsy, over which it has certain distinct advantages. The results obtained from study of a smear from the oral mucosa will no doubt have the same significance, in differential diagnosis, as does the interpretation of a skin biopsy (Barr 1954, 1955).

Summary

Smears were prepared from the oral mucosa of 140 persons (81 males and 59 females) and stained with cresyl echt violet.

The characteristic female-sex chromatin was clearly visible in the epithelial-cell nuclei of females, while a similar chromatin mass was not seen in the cells of males.

This method has the advantage of simplicity. It is suggested as an alternative to skin biopsy for the detection of chromosomal sex in congenital errors of sex development.

We are indebted to Mr. J. E. Walker and Mr. C. E. Jarvis for expert technical assistance. This work was supported by grants from the National Cancer Institute and the National Research Council of Canada.

References at foot of next column

THE ERYTHROCYTE-SEDIMENTATION RATE IN HYPOTHYROIDISM

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IT is well known that acceleration of the erythrocyte-sedimentation rate (E.S.R.) may occur in a variety of conditions associated with increased tissue destruction or with alterations in the blood chemistry. In endocrine disorders the E.S.R. is variable. In thyrotoxicosis, for example, a number of writers have noted that it is sometimes raised (Whitby and Britton 1950). In hypothyroidism, however, so far as I am aware, the only reference in the literature to elevation of the sedimentation rate is by Gram (1929) who noted increased sedimentation values in 4 of 9 cases with low basal metabolism. Wood (1950), on the other hand, has remarked on the normal E.S.R. in myxœdema. For these reasons it is considered that the experience of this clinic, in which acceleration of the E.S.R. has been noted in a high proportion of cases of hypothyroidism, merits publication.

Methods

The sedimentation rate was performed throughout by a standard Westergren technique.

4 ml. of blood was added to 1 ml. of 3·8% sodium citrate solution, graduated glass tubes, appropriately marked, being used. The citrated blood was drawn into Westergren tubes as soon as practicable after withdrawal, and the reading in mm. recorded after the tube had stood vertically for one hour at room-temperature.

Normal values for this method are 3–5 mm. for males and 4–7 mm. for females, but only values in excess of 10 mm. are generally regarded with significance. For the purpose of this paper therefore 10 mm. has been taken as the upper limit of normal.

The Patients

19 patients with hypothyroidism and 4 patients with pituitary hypofunction, in which hypothyroidism was part of the clinical picture, were included in the inquiry. 22 of these patients were female. Their ages ranged from 13 to 76 years. The diagnosis was made on the clinical picture, and in the majority of cases supported by a low basal metabolic rate (B.M.R.), and in every case confirmed by the response to thyroid extract given orally. The youngest in the series, a girl of 13, had had her ectopic thyroid gland removed surgically in the erroneous belief that it represented a thyroglossal cyst.

Results

The E.S.R. was recorded in all patients before treatment was begun, with the exception of 1 patient who

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TABLE I—INITIAL ERYTHROCYTE-SEDIMENTATION RATE, BASAL METABOLIC RATE, BLOOD-CHOLESTEROL, AND HÆMOGLOBIN PERCENTAGE, BEFORE TREATMENT WITH THYROID EXTRACT

Case no.	Age (yr.)	Sex	Cause of hypothyroidism	Duration of symptoms	E.S.R. (mm. in 1 hour) (*on discharge*)	B.M.R. (%)	Blood-cholesterol (mg. per 100 ml.)	Hb (%) (100% = 14·8 g.)
1	44	F	Simmonds's disease	14 yr.	108 (*38*)	−53	220	65
2	40	F	Simmonds's disease	9 yr.	52 (*38*)	−10	250	82
3	76	F	Spontaneous	Uncertain (several yr.)	51	−22	308	74
4	54	F	Simmonds's disease	13 yr.	50	−20	..	74
5	62	F	Radio-iodine (I^{131})	10 mos.	48	..	228	94
6	72	F	Spontaneous	Uncertain (? 6 yr.)	40	−32	..	88
7	32	F	Spontaneous	11 yr.	40	−31	381	34
8	60	F	Spontaneous	1 yr.	37 (*67*)	−14	364	91
9	57	F	Spontaneous	2 yr.	36	−23	470	86
10	43	F	Simmonds's disease	8 yr.	35 (*30*)	−21	174	84
11	54	F	Spontaneous	3 yr.	35 (*50*)	−21	420	72
12	59	F	Spontaneous	1 yr.	28 (*26*)	−20	293	58
13	13	F	Postoperative	9 mos.	28 (*16*)	−32	593	60
14	55	F	Spontaneous	2 yr.	22 (*19*)	−20	182	99
15	39	F	Spontaneous	2 yr.	21	+12	343	74
16	26	F	Spontaneous	6 yr.	20 (*42*)	−46	333	82
17	62	F	Spontaneous	Uncertain (? 4 yr.)	20 (*39*)	−17	143	98
18	62	M	Spontaneous	4 yr.	20	− 8	320	102
19	54	F	Spontaneous	2 yr.	17 (*31*)	−28	445	90
20	58	F	Spontaneous	Uncertain (? 1 yr.)	8	−40	400	92
21	44	F	Spontaneous	1 yr.	7 (*10*)	−19	381	94
22	27	F	Spontaneous	4 mos.	5	−23	211	100
23	47	F	Spontaneous	4 yr.	4	−23	400	82

developed hypothyroidism after a therapeutic dose of radioactive iodine (I^{131}) for thyrotoxicosis (case 5). These results are recorded in table I, together with the age, sex, ætiology, and duration of the hypothyroidism, B.M.R., blood-cholesterol, and hæmoglobin percentage (100% hæmoglobin = 14·8 g. hæmoglobin). In 12 patients the E.S.R. was again recorded prior to discharge from hospital, and this figure is given in parentheses.

TABLE II—COMPARISON OF E.S.R. BEFORE TREATMENT WITH E.S.R. AFTER TREATMENT WITH THYROID EXTRACT FOR OVER ONE YEAR

Case no.	Year	E.S.R. (mm. in 1 hour)	Thyroid (grains daily)
2	1950 1954	52 29	1½ + (cortisone 12·5 mg.)
9	1953 1954	36 19	1
12	1951 1954	28 15	1½
13	1953 1954	28 5	1½
14	1953 1954	22 13	1
15	1952 1954	21 13	1
16	1947 1954	20 9	1
19	1949 1954	17 10	1

From table I it can be seen that 19 of the 23 recordings exceeded 10 mm. per hour, 18 being 20 mm. or more. In only 4 patients was the E.S.R. within normal limits.

Several of these patients require more particular mention.

Case 20 had an initial E.S.R. of 8 mm., but when it was repeated on three subsequent occasions while under treatment it was at all times over 30 mm. The B.M.R. was normal in case 15, but the patient was clinically hypothyroid, and the blood-cholesterol was raised. On receiving gr. 2 of thyroid extract daily there was considerable clinical improvement.

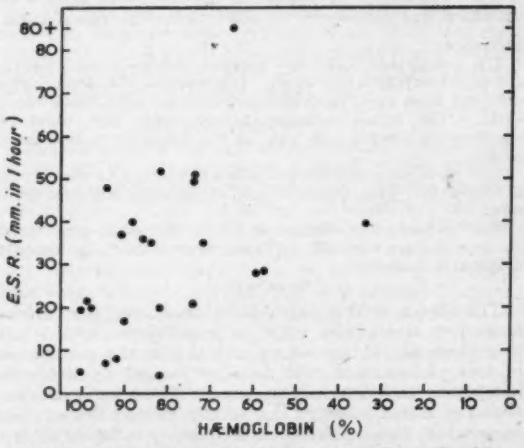
Cases 1, 2, 4, and 10 had Simmonds's disease, all following postpartum hæmorrhage. Other endocrine deficiencies were present.

From table I it is apparent that the E.S.R. at the time of hospital discharge, after only two to four weeks of treatment with thyroid extract, is very variable; in 6 patients a rise was observed, and in 6 a fall. Unfortunately only 8 patients who had been receiving maintenance doses of thyroid extract for periods in excess of one year were available for further study, but in all 8 patients the E.S.R. had fallen from pre-treatment levels—in 3 cases to normal; in 4 to levels between 10 and 20 mm., while in 1 patient who had Simmonds's disease, and who still appeared myxœdematous, the E.S.R. had fallen from 52 to 29 mm. These results are recorded in table II.

Anæmia and the E.S.R.

Of the 23 patients in this series 14 had hæmoglobin levels of less than 90%. In most cases the anæmia was normochromic, but in 4 it was hypochromic. In fig. 1 the E.S.R. is plotted against the hæmoglobin level. The results show that the raised sedimentation rate is not related to the hæmoglobin level; of the 9 patients with hæmoglobin levels of 90% or more, the E.S.R. varied from 5 mm. to 48 mm., being 20 mm. or more in 5 of them.

For several reasons the E.S.R. has not been "corrected" for anæmia. The basis of correction charts is faulty, depending on varying dilutions of normal blood in order to manipulate the hæmoglobin percentage, red-cell count, or packed-cell volume. Such a chart is only valid for the blood sample on which the manipulation has been performed. Furthermore, in some cases of anæmia, particularly in those due to simple iron deficiency or hæmorrhage, no significant alteration in sedimentation



E.S.R. in relation to hæmoglobin level in untreated hypothyroidism.

may occur with the Westergren method (Davis 1946, Terry 1950); on the other hand, anæmias due to other causes, such as pernicious anæmia, leukæmia, and hepatic cirrhosis, may be associated with a variable increase in sedimentation. Anæmia, therefore, is an inconstant factor in its effect on sedimentation, depending not only on its degree, but also on its cause, and for this no correction table is available.

Cholesterol and the E.S.R.

It is well known that hypothyroidism is often associated with a raised blood-cholesterol. In this series 13 patients with primary hypothyroidism had cholesterol levels exceeding 300 mg. per 100 ml. Blood-cholesterol was normal in 4 patients with Simmonds's disease despite the presence of symptoms and signs of hypothyroidism. In a recent paper by Wilson et al. (1954) on incomplete pituitary insufficiency, a low B.M.R. and normal blood-cholesterol were observed in all their 8 patients. Despite the frequency of a raised blood-cholesterol, no correlation between it and the E.S.R. is apparent from the results (table I). Of the 4 patients with normal E.S.R.s, the blood-cholesterol exceeded 380 mg. per 100 ml. in 3. Similar observations in subjects with lipæmia, as judged by elevation of the plasma-cholesterol, have been made by Ham and Curtis (1938), who found that, although the E.S.R. was raised in certain instances, no causal relationship between cholesterol level and E.S.R. could be established.

Incidence of Other Diseases

Apart from anæmia, the most frequent conditions coexisting with hypothyroidism in this series were hypertension and angina pectoris (cases 3, 5, 6, 9, 11, 14, 17, and 20). A patient was considered to be hypertensive if the diastolic blood-pressure exceeded 100 mm. Hg on admission to hospital. The majority of hypertensive patients became normotensive during their period of bed rest. Neither hypertension nor angina pectoris are known causes of acceleration of the E.S.R., and in no case did the electrocardiogram show evidence of recent myocardial infarction. One patient (case 5) had a myocardial infarction while under treatment for thyrotoxicosis eighteen months before she developed hypothyroidism.

Four patients had Simmonds's disease (cases 1, 2, 4, and 10). An increase in the E.S.R. in Simmonds's disease has previously been observed by Wilson (1953) and Wilson et al. (1954). One patient (case 7) had been in a mental hospital where a diagnosis of schizophrenia had been made. In the remaining 10 patients no other condition likely to influence the sedimentation rate was recognised. In particular no apparent source of infection was discovered to account for the raised E.S.R.

Statistics

The correlation coefficient between the E.S.R. and hæmoglobin percentage is $r = -0{\cdot}40$. This value is not significantly different from zero, the value required for significance being $-0{\cdot}42$. The figure, however, is suggestive and could be significantly altered one way or the other by a few more results.

The correlation coefficient between the E.S.R. and B.M.R. is $r = -0{\cdot}32$. This value is not significantly different from zero.

The correlation coefficient between the E.S.R. and blood cholesterol is $r = -0{\cdot}23$. This value is not significantly different from zero.

Conclusion

The object of this paper is to draw attention to the frequency of a raised E.S.R. in hypothyroidism. While it is obviously of interest to inquire into the mechanism of this phenomenon, the data at present available do not justify any definite conclusion. The results indicate that the raised E.S.R. is not wholly due to the anæmia from which these patients so frequently suffer or that it can be correlated with an increase in blood-cholesterol. Alteration in the plasma-proteins is known to influence the E.S.R. Electrophoretic studies on patients with hypothyroidism have shown a decrease in the relative albumin concentration and a significant increase in the concentration of β-globulin. Thyroid therapy caused a fall in the β-globulin (Stern and Reiner 1946). Electrophoretic studies were not performed on the patients in this series, but routine serum-protein estimations were recorded in 15 patients, and 10 were found to have serum-globulin levels above 2·9 g. per 100 ml., the accepted upper limit of normal in the biochemistry department in this hospital. Of these 10 patients, 9 had a raised E.S.R., while of the 5 patients with normal serum-globulin, 3 had normal E.S.R.s. These results, however, lack full significance through failure to consider the fibrinogen fraction of the plasma, as an increase in the latter is known to greatly accelerate sedimentation of the red cells.

Despite the lack of a definite conclusion as to the cause of the acceleration of the E.S.R., the facts are recorded in order to draw attention to what has been, in our experience, a common finding, and one to which only one previous reference appears to have been made in the literature.

Summary

In a series of 23 cases of hypothyroidism the E.S.R. was found to be raised in 19. 4 cases in this series had Simmonds's disease; all had a considerably raised E.S.R. The cause of this phenomenon is briefly discussed.

I wish to thank Prof. L. J. Davis for his helpful advice. I am indebted to Dr. R. Robb, of the statistics department, University of Glasgow, for the coefficients of correlation between the E.S.R. and the hæmoglobin percentage, B.M.R., and blood-cholesterol level. Part of the expenses for this work was borne by the Rankin Fund of the University of Glasgow.

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HÆMOPTYSIS AS A SYMPTOM OF RETROSTERNAL GOITRE

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RETROSTERNAL goitre represents but a small group of thyroid swellings. Its interest and importance lie in the symptoms and signs produced by pressure. Estimates of its frequency differ, probably owing to lack of uniformity in the description of this type of goitre (Pemberton 1921, Sauerbruch and Felix 1927).

Rundle (1951) classifies retrosternal goitres into four groups: substernal, the commonest form and consisting of a prolongation of a cervical goitre behind the sternum; intrathoracic, wholly in the chest; mediastinal, between the great veins and in front of the aorta; and *goitres plongeants*, intrathoracic goitres which can be forced into the neck by raised intrathoracic pressure, as in coughing.

Retrosternal goitre is diagnosed from pressure symptoms at the thoracic inlet and the radiographic appearance of a swelling behind the upper part of the sternum.

The commonest clinical manifestations are due to tracheal, œsophageal, and vascular compression. Dyspnœa, cough, and venous engorgement are prominent. Not infrequently paralysis of the recurrent laryngeal nerve and sympathetic paralysis (Higgins 1927) have

been recorded. Hæmoptysis as a presenting symptom does not seem to have been observed, although in the last five years in the department of thoracic surgery at this hospital three patients with retrosternal goitre have presented with hæmoptysis out of a total of fifteen treated.

Case-reports

Case 1.—A man, aged 67, was referred with a provisional diagnosis of bronchial carcinoma. Over the previous nine months he had lost 2 st. in weight, and for two months he had experienced hæmoptysis daily, about two tablespoonfuls in quantity and bright red, unmixed with sputum.

Examination showed a fit man for his age, although he had obviously lost weight. His thyroid gland appeared normal, and trachea central. Dilated veins were present over the upper chest and arms. No other abnormality was detected on physical examination.

Investigations.—No tubercle bacilli were seen in the sputum. Radiographs of the chest showed a large mass in the upper mediastinum, displacing the trachea to the right and the œsophagus to the left. Screening did not reveal any movement of the mass on swallowing. Diaphragmatic movement was normal, and the lung fields were emphysematous. No radiographic evidence of bronchial carcinoma. Bronchoscopy showed a normal larynx. The trachea was deviated to the right slightly, and its left wall was indented.

At operation a colloid goitre was found extending from the right lower pole into the upper mediastinum. It enveloped the trachea, except its posterior aspect, and descended to the level of the aortic arch. After removal of the goitre the patient has had no recurrence of symptoms.

Case 2.—A man, aged 72, complained of dyspnœa on exertion and of hæmoptysis. Eleven years previously he had had an adenoma of the thyroid removed. Eight years later he noted that he was dyspnœic on exertion and when lying down. Six months ago his voice became weak, and in the last two months he had hæmoptysis on two occasions, the blood being bright red, but he could not estimate how much.

Investigations.—Radiographs of the chest showed a large superior mediastinal tumour displacing the œsophagus forwards and to the left. The trachea was far displaced to the left and laterally compressed.

At operation the place of the right lobe of the thyroid was found to be taken by a large adenoma extending into the thorax and passing behind the trachea. After his operation the patient has had no recurrence of symptoms.

Case 3.—A female shop-assistant, aged 48, was referred in June, 1950, with a provisional diagnosis of bronchiectasis. She complained of hæmoptysis lasting seven days in 1949. The blood was dark red and came into the back of her mouth "as if it had come from her windpipe." Six months later and thereafter at two-monthly intervals the hæmoptysis recurred—a cupful of blood each time and unmixed with sputum.

Examination showed a healthy woman with a midline suprasternal swelling which was ill defined and did not move on swallowing.

Investigations.—Tubercle bacilli were not seen in the sputum. Radiographs of the chest showed a soft-tissue swelling in the left side of the thoracic inlet. No evidence of pulmonary tuberculosis. Screening showed that the swelling moved on swallowing and was continuous with the cervical thyroid swelling. The trachea was pushed over to the right. Bronchoscopy showed no abnormality.

At operation a retrosternal enlargement of the thyroid extending from the left lobe was found. No recurrence of symptoms followed the operation.

Discussion

From these three cases it will be noted that the blood was unmixed with sputum. In two cases the hæmoptysis was considerable, and one patient could not estimate the quantity. Since these goitres lie behind the sternum, there is an increase in local pressure on the surrounding structures. The veins are obstructed before the arteries and became engorged. The inferior thyroid vessels, together with the internal jugular, innominate, and superior vena cava, depending on the extent of the goitre, take part in this congestion. This increased venous pressure manifests itself clinically as distended cutaneous veins of the neck and upper part of the arms, and sometimes œdema, as the venous flow finds an alternative return to the heart. At operation troublesome venous bleeding occurs. The increased venous pressure is probably also responsible for the hæmoptysis.

The trachea derives its blood-supply from the inferior thyroid artery (Johnston and Whillis 1944) and is drained by the inferior thyroid veins, in which venous engorgement takes place as a result of compression. Rupture of a tracheal vein would be associated with bleeding relieved by a drop in the venous pressure—i.e., it would be fairly brisk, unmixed with sputum, and copious.

Summary

Hæmoptysis due to retrosternal goitre is described. Three cases are noted. A mechanism for the production of this symptom is suggested.

I am indebted to Mr. W. F. Nicholson for permission to publish his cases and for helpful advice, and to Mr. A. Graham Bryce for permission to publish one of his cases.

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CORRELATION OF SERUM-VITAMIN B_{12} LEVELS AND URINARY FOLIC ACID IN NUTRITIONAL MEGALOBLASTIC ANÆMIA

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NUTRITIONAL megaloblastic anæmia and the closely related megaloblastic anæmia of pregnancy are considered by most workers to be caused primarily by a deficiency of folic acid, and at present folic acid is regarded as the treatment of choice (Davidson 1948, Spies et al. 1948, Wilkinson 1948).

Vitamin B_{12} is also therapeutically active in some of these patients in India (Patel and Kocher 1950, Chaudhuri 1951, Das Gupta et al. 1953), as I have found it in some of my patients in Malaya. Low serum-vitamin B_{12} levels have been found in patients with pernicious anæmia and with other types of megaloblastic anæmia (Mollin and Ross 1952, 1954, Unglaub et al. 1954); similar low levels have been found among the patients seen here.

Details of the interrelationship between folic acid and vitamin B_{12} in the ætiology of megaloblastic anæmia are still largely unknown; but that a relationship exists is well established (Vilter et al. 1950, Girdwood 1952a and b). I report here a correlation found between the serum-vitamin B_{12} level and the urinary excretion of folic acid after a loading dose.

Material

The 29 patients studied came from the lower-income groups served by the General Hospital, Kuala Lumpur, Malaya, most of them being Indian and Chinese labourers and artisans. They all had gross nutritional megaloblastic anæmia, proved in each case by marrow biopsy. Clinical sprue was not seen by me in this population, and four representative patients with severe megaloblastic anæmia gave normal vitamin-A absorption curves and normal radiological intestinal patterns. Nearly all the patients had a hæmoglobin concentration of 5 g. or less per 100 ml., and had received no previous treatment except iron. None of them had severe pyrexia, but some had a slightly raised temperature not associated with any clinical infection, as is sometimes seen in severe megaloblastic anæmia. There was no gross œdema or other clinical evidence of disease, apart from that related

directly to anæmia and malnutrition. A few patients were excluded when it was found that they had a urinary output of less than 300 ml. in six hours during the determination of the urinary excretion of folic acid, because a urinary flow as small as this affects the output of folic acid.

Methods

The serum-vitamin B_{12} levels were kindly estimated by Dr. G. I. M. Ross and Dr. D. L. Mollin at the Postgraduate Medical School, London, using *Euglena gracilis* as the test organism (Ross 1952). Urinary folic acid was estimated as recommended by Girdwood (1953a and b); the test organism was *Streptococcus lactis R* (Gradwohl and Kouri 1948). A twelve-tube assay technique was used, and the tests were planned for statistical accuracy as suggested by Wood (1953).

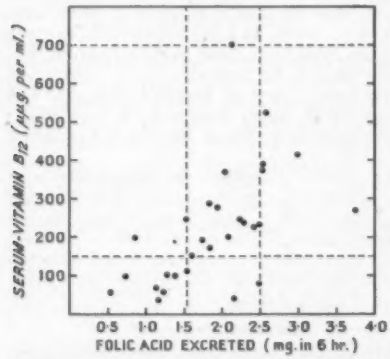
A loading dose of 5 mg. of folic acid was given subcutaneously, and the amount excreted in the urine in the following six hours was assayed. Folic acid 15 mg. was then given each day parenterally for the next five days to ensure tissue saturation. Forty-eight hours after the last dose the second loading dose of folic acid (5 mg.) was given orally and the subsequent six-hours urinary excretion was assayed as before.

Results

The normal range for total serum-vitamin B_{12} is given by Mollin and Ross (1952) as 100–720 μμg. (mean 358 μμg.) per ml. Of the present 29 patients with megaloblastic anæmia 11 had low levels.

A normal range of urinary excretion of folic acid was established for 15 patients with normoblastic iron-deficiency nutritional anæmia of comparable severity. The subcutaneous loading dose gave a mean excretion of 2·02 mg. (standard deviation 0·236) and the oral loading dose 1·63 mg. (standard deviation 0·238). In the patients with megaloblastic anæmia the excretion of folic acid was below normal after the subcutaneous loading dose in 8, and after the oral loading dose in 11.

The accompanying figure shows the relationship between the urinary folic acid and the serum-vitamin B_{12} level in these 29 patients, compared with the normal ranges, after the subcutaneous loading dose. As the excretion of folic acid decreased, so the serum-vitamin B_{12} level fell, although both remained within normal limits, even though these patients had severe megaloblastic anæmia. Only when urinary folic acid reached values below normal did the serum-vitamin B_{12} level also drop to a pathological value. This regression was highly significant ($0·001<P<0·01$).



Correlation between serum-vitamin B_{12} level and urinary excretion of folic acid during six hours after loading dose of 5 mg.

The excretion of folic acid after the oral loading dose showed no such correlation, but these figures are presented in the accompanying table; low values presumably indicate poor absorption.

Discussion

When a small dose of folic acid is given subcutaneously it may go to the tissues or be excreted in the urine. If the proportion of folic acid going to the tissues increases as the body becomes more depleted of folic acid, the amount excreted in the urine will be inversely proportional to the degree of folic-acid deficiency. In that case the vitamin-B_{12} deficiency only develops when the folic-acid deficiency has become severe.

In pernicious anæmia, which is regarded as primarily a vitamin-B_{12} deficiency, the excretion of folic acid is decreased (Spray and Witts 1952), as in the present cases. Since pernicious anæmia also responds to folic-acid therapy, it can be assumed that there is a folic-acid deficiency conditioned by the vitamin-B_{12} deficiency. This appears to be the opposite of the hypothesis given above for these nutritional megaloblastic anæmias. Spray and Witts (1952) suggest that a vitamin-B_{12} deficiency may lead to a conditioned retention of folic acid in the tissues, accounting for this low excretion.

Nieweg et al. (1954) found that, in non-pernicious megaloblastic anæmia, folic-acid levels tended to be normal when the vitamin-B_{12} level was low, and vice versa; in about half their pernicious-anæmia patients both vitamins were at low levels. They also, like Spray and Witts, believe that a vitamin-B_{12} deficiency can influence the storage of folic acid.

In the present investigation the excretion of folic acid was normal while the serum-vitamin B_{12} level was normal, in spite of the fact that the patients had severe megaloblastic anæmia. This supports the suggestion of Spray and Witts that the excretion of folic acid does not measure the tissue depletion but, rather, follows the vitamin-B_{12} deficiency.

Finally, it is possible that a vitamin-B_{12} deficiency may develop independently of an already established folic-acid deficiency.

Between these two vitamins it is still not known which deficiency develops first—which is the horse and which the cart—but certainly a deficiency of both can be present in this type of megaloblastic anæmia as observed in Malaya.

SERUM-VITAMIN B_{12} LEVELS AND EXCRETION OF FOLIC ACID AFTER A LOADING DOSE OF 5 MG.

Case no.	Vitamin B_{12} in serum (μμg. per ml.)	Excretion of folic acid (mg. in 6 hr.)	
		After subcutaneous loading dose	After oral loading dose
1	700	2·15	1·45
2	525	2·60	1·50
3	415	3·00	1·90
4	390	2·55	1·65
5	375	2·55	1·00
6	370	2·07	0·34
7	290	1·85	1·18
8	280	1·96	1·15
9	270	3·75	0·77
10	250	1·55	0·86
11	250	2·25	0·96
12	240	2·30	1·68
13	235	2·50	1·86
14	230	2·42	1·67
15	200	0·87	2·05
16	200	2·10	0·71
17	195	1·73	0·71
18	175	1·84	1·30
19	155	1·62	2·58
20	115	1·55	1·23
21	105	1·29	0·72
22	100	0·75	—
23	100	1·40	1·60
24	80	2·50	0·52
25	70	1·15	2·15
26	60	1·25	0·71
27	60	0·57	1·40
28	45	2·17	0·66
29	40	1·18	1·20

Summary

A close correlation was found between the serum-vitamin B_{12} level and the urinary excretion of folic acid after a subcutaneous loading dose of 5 mg. in patients with severe megaloblastic anæmia.

When the serum-vitamin B_{12} level was low, the excretion of folic acid was low also.

I am indebted to Dr. D. L. Mollin and Dr. R. H. Girwood for helpful criticism.

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CHRONIC HYPOPOTASSÆMIA OF RENAL ORIGIN

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MUSCULAR weakness or paralysis due to low serum-potassium levels is well recognised, and the causes of low serum-potassium levels are numerous. When renal disease causes disordered potassium metabolism, there is usually potassium retention with high serum-potassium levels affecting mainly the heart and skeletal muscles. Within recent years, however, reports have been published of renal disease causing excessive urinary excretion of potassium, low serum-potassium levels, and paralysis.

Brown et al. (1944) reported three patients with hypopotassæmia due to renal disease; Kjerulf-Jensen et al. (1951) reported a woman with persistently low serum-potassium levels which may have been renal in origin; Davidsen et al. (1951) recorded a case of chronic potassium deficiency probably due to renal disease; and Earle et al. (1951) made prolonged observations on a Chinese with renal hypopotassæmia.

We present here our observations on another patient with this syndrome, who is unusual in having remarkably little renal damage.

Clinical Record

The patient was seen by one of us (E. G. S.) in consultation on Sept. 8, 1952, because of generalised weakness and sudden attacks of paralysis during the previous few months. She was a married European woman aged 37, and had been in her usual good health until half-way through her third and latest pregnancy. About this time she began to have undue fatigue, which became progressively worse up to the time of her delivery. This third pregnancy, like her previous two pregnancies, was abnormal.

Her first pregnancy was ectopic, necessitating the removal of her right fallopian tube on April 20, 1947. Her blood-pressure then was 160/100 mm. Hg and her urine was normal.

She became pregnant again in 1948, when her blood-pressure and urine were normal. Because of slight albuminuria and hypertension (blood-pressure 165/110 mm. Hg) in the last few weeks of pregnancy, labour was induced surgically two weeks before the expected date of delivery. The puerperium was normal, and two weeks post partum her blood-pressure had returned to normal.

Her third pregnancy began in 1951, the last menstrual period starting on June 16. She had no albuminuria then, but her blood-pressure was 165/100 mm. Hg and remained about this level during the first trimester, fell to about 145/85 mm. Hg in the middle trimester, and rose to about 165/95 mm. Hg in the last two months. Labour was induced on March 14, 1952, a week before the expected date of delivery. It was during the latter half of this pregnancy that the patient developed excessive fatigue.

She felt well on discharge from hospital, but after a week at home she again became very tired. After two months her milk began to diminish, and the baby took an hour over each feed. On May 14, 1952, after feeding the baby she suddenly collapsed on the bed and could scarcely move an arm or a leg. She regained her strength in three days. After this episode she continued to be very tired after slight exertion.

After a further interval she developed attacks of weakness of the legs in which she would suddenly drop to the ground and have great difficulty in getting up again. There was no disturbance of consciousness in these attacks, and she described them as a feeling as if someone had struck her behind the knees, causing her legs to buckle up under her. The first such attack came on about three days after her collapse after feeding the baby. On this evening she unexpectedly dropped to the floor, and her husband had to help her to bed. Similar episodes took place about once a week thereafter at any hour of the day.

In July, 1952, the weakness in her arms became worse, causing clumsiness, and she often dropped things. She would test the power in her legs by raising herself on tiptoe and then take one foot off the ground. Often her legs were too weak to support her.

As time went by, although these recurrent paralyses became no more frequent, they were more severe and lasted longer. In August, 1952, she had two severe episodes and was severely paralysed for several days. The last attack before seeing E. G. S. was on Aug. 28, 1952, and on this occasion, after having afternoon tea, she stood up, but on stepping forward she fell to the floor and could not get up. She was carried to bed and remained there for five days. For the first two days she could not move her legs and could barely lift her arms. It was eight days before she could walk without assistance.

In all the attacks only the skeletal musculature was affected and there were no symptoms of weakness in the muscles supplied by the cranial nerves. The legs were often affected alone and were always more paralysed than the arms. There had been no respiratory distress. The only symptom of abnormal sensation was occasional tingling and numbness of the hands.

Her previous history revealed nothing of significance other than the abnormal pregnancies. The family history was unimportant.

Routine interrogation brought to light the following points:

In the preceding twelve months the patient had developed frequency of micturition, nocturia, polyuria, and increased thirst.

For several months she had noticed a rather unusual visual defect. When reading, she could see clearly only the central portion of one line, the rest of the page being blurred. This disability was so great that she had given up reading.

On admission to the Auckland Public Hospital for investigation on Sept. 11, 1952, physical examination gave the following results:

She was intelligent and coöperative but languid. Careful examination of the nervous system revealed only generalised skeletal muscular weakness, greatest in the legs. No changes in sensory appreciation were detected, and all her superficial and deep reflexes were brisk and her plantar responses flexor. Her optic fundi were normal; she had normal visual acuity, and her visual fields were full. Her gait was shuffling and unsteady, and after walking about twenty-five yards she became exhausted and had to support herself by holding on to the wall. Her blood-pressure was 165/100 mm. Hg, the cardiovascular system being otherwise normal. The respiratory and alimentary systems were normal. A catheter specimen of urine contained a faint trace of albumin, an occasional epithelial cell, and one leucocyte per high power field. The urine was sterile on culture.

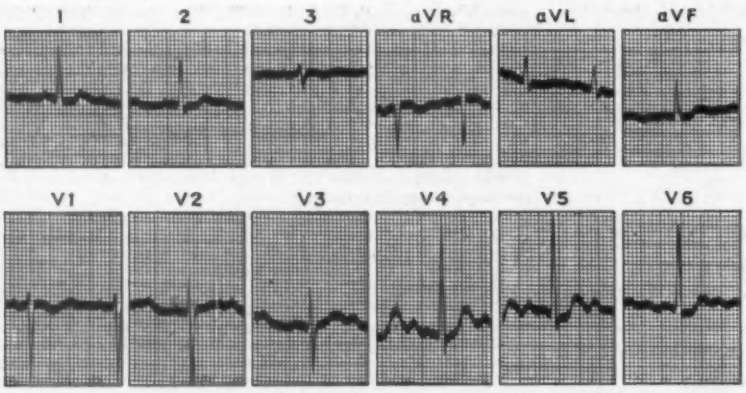

Fig. 1—Electrocardiogram on Oct. 3, 1952, when serum-potassium level was 2·15 m.eq. per litre, showing changes characteristic of hypopotassæmia.

Since her attacks of paralysis were similar in certain respects to those occurring in familial periodic paralysis, her serum-potassium level was estimated and was 2·41 m.eq. per litre. Next day it was 2·61 m.eq. per litre. Thus it appeared very probable that hypopotassæmia was the cause of her muscular weakness and episodes of paralysis. The hypertension, nocturia, and albuminuria suggested renal disease as the underlying pathology.

Special Studies

Laboratory methods.—Blood-glucose levels were determined by a modification of the Haslewood and Strookman (1939) method and record true glucose values. Sodium and potassium levels were estimated with a Beckman flame photometer. Glomerular filtration-rate was measured by the sodium-thiosulphate clearance and renal plasma-flow with *p*-amino-hippuric acid (both by the single-injection technique). All other biochemical determinations were made by conventional methods.

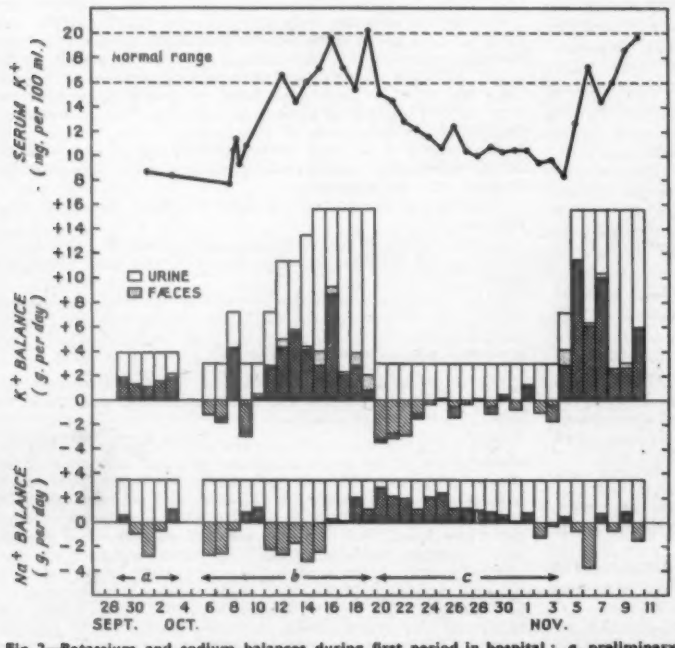

Fig. 2—Potassium and sodium balances during first period in hospital: *a*, preliminary balance on a stabilised potassium intake of 3·9 g. daily; *b*, period of potassium therapy; and *c*, period following potassium therapy. Intake is calculated upwards from zero, and output downwards from top of relevant histogram.

Initial Period of General Investigation and Assessment

This period lasted a month, from the patient's admission on Sept. 11 until the start of potassium therapy on Oct. 11.

During the month the serum-potassium levels were determined under normal dietary conditions on seven occasions, the values being 2·41, 2·61, 2·03, 2·36, 2·18, 2·15, and 2·61 m.eq. per litre. The electrocardiogram (fig. 1) showed the features typical of hypopotassæmia: rate 53 per minute; P waves of low voltage; P-R interval 0·2 second; tall R waves in V_4, V_5, and V_6; ST segments sagging; T waves of low voltage; QT interval 0·48 second (upper limit of normal is 0·45 second); and very prominent U waves.

Chest radiography showed the lung fields to be clear. The left ventricle was prominent, and there was some unfolding of the aorta. The cardiothoracic index was 53·5.

The patient was slightly anæmic (Hb 12·1 g. per 100 ml.) and the erythrocyte-sedimentation rate was 23 mm. in 1st hour (Westergren). Two weeks later examination of the blood showed red cells 4,140,000 per c.mm., Hb 12·6 g. per 100 ml., and leucocytes 6200 per c.mm. (neutrophils 89%, eosinophils 1%, lymphocytes 10%). The stained film was normal.

The urine contained a trace of protein and an occasional epithelial cell and leucocyte but showed no growth on culture. A Van Slyke urea-clearance test done on Sept. 21 gave a blood-urea level of 34 mg. per 100 ml. and a mean standard clearance value of 50%. After nineteen hours' abstention from fluids the specific gravity of the urine was 1·016.

Other routine laboratory examinations gave results within normal limits except the low levels of plasma-protein and of follicle-stimulating hormone (F.S.H.): total plasma-protein 5·4 g. per 100 ml. (albumin 3·7 g. per 100 ml., globulin 1·7 g. per 100 ml.); colloidal gold flocculation 0; thymol turbidity 1·6 units; Takata Ara negative; serum-sodium 148 m.eq. per litre; blood-glucose 70 mg. per 100 ml.; serum-calcium 9·5 mg. per 100 ml.; serum-phosphorus 2·8 mg. per 100 ml.; plasma-carbon dioxide combining power 66 vols per 100 ml. (HCO_3 29·7 m.eq. per litre); plasma-chloride 101 m.eq. per litre; plasma-cholesterol 210 mg. per 100 ml.; Wassermann reaction and Kahn test negative; urinary excretion of 17-ketosteroids (Callow method) 4·1 mg. per twenty-four hours; urinary gonadotrophin—pituitary follicle-stimulating hormone assayed by the mouse uterine-enlargement method of Klinefelter et al. (1943)—less than 6·6 mouse units per twenty-four hours; and basal metabolic rate + 20%.

The fasting blood-glucose level was 74 mg. per 100 ml. After an oral dose of 100 g. of glucose the blood-levels at half-hour intervals were 112, 148, 152, 154, 152, 126, 60, and 75 mg. per 100 ml. No glucose appeared in the urine. After this oral dose of glucose the serum-potassium level fell from 2·15 to 1·74 m.eq. per litre.

The urea-clearance test was repeated after an oral dose of 15 g. of urea, the mean standard clearance value being 64%.

An intravenous pyelogram showed excretion from both kidneys within five minutes. There was distortion of the calyces on the right side, and the appearance was considered to be consistent with mild chronic pyelonephritis. The shadows of the ureters and bladder appeared normal.

A full dietary analysis showed that the patient's diet had been adequate in all respects. The patient was placed on a controlled dietary intake of potassium for five

RENAL CLEARANCE DETERMINATIONS. THE RESULTS ARE MEAN VALUES FOR TWO CLEARANCE PERIODS CORRECTED TO A BODY-SURFACE AREA OF 1·73 SQ. M. THEY ARE EXPRESSED AS ML. PER MINUTE EXCEPT THE UREA CLEARANCE, WHICH IS RECORDED AS A PERCENTAGE OF NORMAL (STANDARD OR MAXIMAL DEPENDING ON URINE FLOW)

Date	Rate of excretion of urine (ml. per min.)	Sodium thiosulphate clearance (G.F.R.) (ml. per min.)	p-aminohippuric-acid clearance (E.R.P.F.) (ml. per min.)	Urea clearance (% of normal)	Endogenous creatinine clearance (ml. per min.)
Sept. 21, 1952	1·2	..	..	50 %	..
,, 25, ,,	1·4	..	..	64 %	..
Oct. 17, ,,	5·2	108	..	89 %	..
Nov. 4, ,,	4·6	94	..	84 %	..
Feb. 3, 1953	13·8	..	432	..	..
Sept. 22, ,,	7·0	108	..	107 %	124
Oct. 14, ,,	10·9	..	476	..	126

E.R.P.F., effective renal plasma flow.
G.F.R., glomerular filtration-rate.

days, and the excretion of sodium and of potassium was determined by analysis of the urine and fæces. The calculated potassium of this diet was 3·9 g. daily, which was slightly greater than that of the ward diet (about 3 g. daily). The result of this preliminary balance study is shown in fig. 2*a* and demonstrates a net retention of about 7·5 g. of potassium in the five days.

During this period the patient was languid and apathetic and preferred to rest in bed. She was weak and unsteady on her feet and dropped things frequently. Her visual defect continued to hamper her reading. She was constipated and said that she had been constipated for some months before admission. Although she was very weak she had no attacks of paralysis while in hospital.

Period of Potassium Therapy

During this period the excretion of potassium and sodium in the urine and fæces was determined.

The intake of potassium from the ordinary ward diet was about 3 g. daily (the sodium content of the diet was about 3·5 g. daily). After a test dose of 8 g. of potassium chloride given on Oct. 8 larger doses were started on Oct. 11, the potassium intake rising from 7·7 g. on this date to 15·6 g. on Oct. 15 (8 g. of potassium chloride thrice daily after meals), at which level it remained until Oct. 19, when potassium therapy was abruptly discontinued. The effect of this treatment on the serum-potassium level and on the excretion of sodium and potassium is shown in fig. 2*b*. There was during this period a net retention of about 35 g. of potassium, equivalent to about 17% of the total body-potassium, and a loss of sodium, particularly during the initial stage of the potassium therapy.

On Oct. 17 thiosulphate clearance and urea clearance were simultaneously estimated. The results (see table) show that the glomerular filtration-rate and urea clearance were within normal limits. The urine flow averaged 5·2 ml. a minute.

As shown in fig. 2*b* the serum-potassium level rose to normal after four days' supplementary potassium. The electrocardiogram was then normal, being identical with that shown in fig. 3, which is the electrocardiogram taken on Jan. 20, 1953, after about two months' potassium therapy.

When potassium therapy was begun, the patient's condition changed dramatically. Associated with the rise of the serum-potassium level to normal was a return to normal muscle tone, power, and coördination, and her personality changed: she felt so full of energy that for the first few mornings she used to run along the corridor to the bathroom; from being languid and apathetic she became alert and eager, and she herself commented on this change. The frequency of micturition, nocturia, and polyuria disappeared.

Period Following Cessation of Potassium Therapy

This period (fig. 2*c*) was one of potassium loss and sodium retention.

The serum-potassium level gradually declined to 2·15 m.eq. per litre on Nov. 4, when the results of thiosulphate-clearance and urea-clearance tests were not significantly different from those obtained previously (see table).

During this period of the balance experiment it was clear that, owing to excessive urinary excretion, there was a negative balance for potassium under normal dietary conditions when the serum-potassium level was within normal limits. At first about 6 g. of potassium was excreted daily (about 28% of the potassium filtered by the glomeruli); and, even when the serum-potassium level fell to 2·56 m.eq. per litre some 20% of the potassium filtered by the glomeruli was still excreted in the urine. The normal kidney excretes only 10–15% of the filtered potassium under ordinary dietary conditions.*

Certain other laboratory examinations were made. Chromatography of the urine showed a normal excretion of amino-acids, and a specific-gravity fixation test done on Nov. 8 gave a maximal concentration of 1·022 after sixteen hours' deprivation of fluid.

When potassium chloride was withheld, the patient soon relapsed to her previous state of weakness, lethargy, and depression, and restricted (tubular) vision recurred.

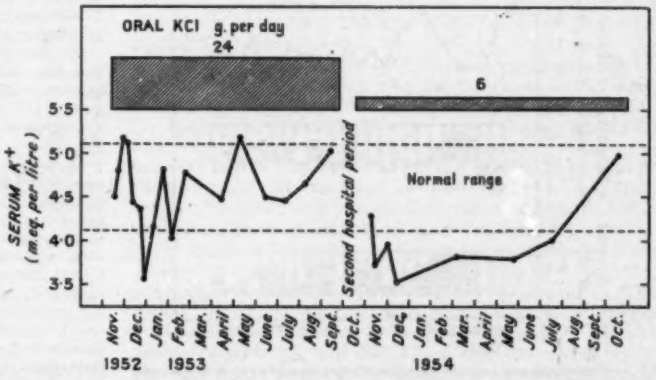

Fig. 4—Serum-potassium levels in 2 years during which the patient was under outpatient supervision.

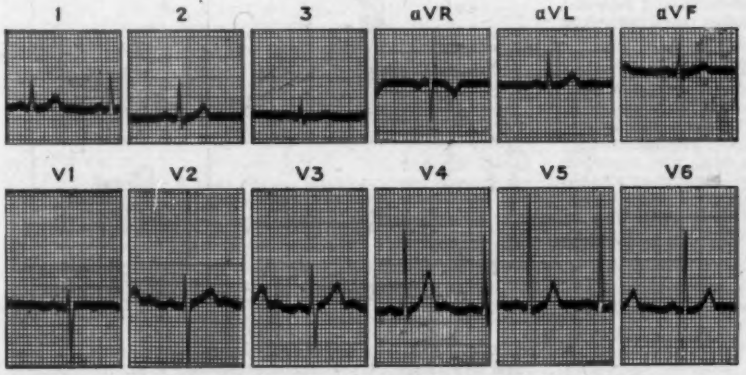

Fig. 3—Electrocardiogram on Jan. 20, 1953, after potassium therapy.

* The potassium and sodium clearances could not be assessed precisely with thiosulphate during the determination of the glomerular filtration-rate, because this substance inhibits renal tubular reabsorption of both potassium and sodium.

After the remarkable transient improvement under potassium therapy, her depression was worse than on admission, making further depletion for more investigations at that time unwarranted. Therapy with potassium chloride (24 g. daily) was resumed on the evening of Nov. 4 and continued for about twelve months.

Outpatient Supervision on Potassium Therapy

For the next twelve months she received potassium therapy while under supervision as an outpatient.

After her discharge from hospital on Nov. 11, 1952, serum-potassium levels were determined at first weekly and later monthly, the values, with one or two exceptions, falling within normal limits (fig. 4). Thus no particular difficulty was experienced in maintaining a normal serum-potassium level.

Redetermination of some of the previous biochemical estimations after several weeks of potassium therapy gave the following values in the serum: total non-protein nitrogen 19 mg. per 100 ml., total protein 5·9 g. per 100 ml. (albumin 4·3, globulin 1·6 g. per 100 ml.), sodium 147 m.eq. per litre, chloride 105 m.eq. per litre, phosphorus 3·4 mg. per 100 ml., calcium 9·3 mg. per 100 ml., carbon-dioxide combining power

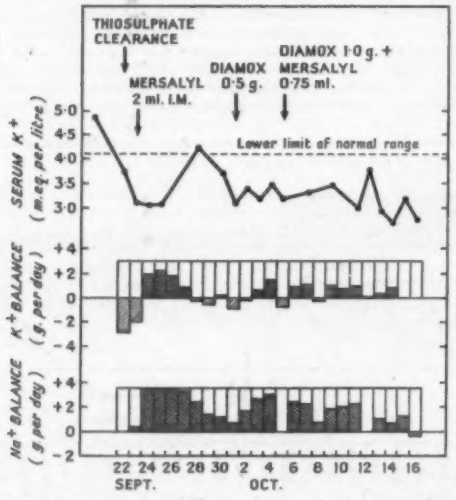
THIOSULPHATE CLEARANCE
MERSALYL 2 ml. I.M.
DIAMOX 0·5 g.
DIAMOX 1·0 g. + MERSALYL 0·75 ml.
SERUM K+ (m.eq. per litre)
Lower limit of normal range
K+ BALANCE (g. per day)
Na+ BALANCE (g. per day)
22 24 26 28 30 2 4 6 8 10 12 14 16
SEPT.
OCT.

Fig. 5—Potassium and sodium balances during second period in hospital.

52 vols. per 100 ml. (HCO_3 23·2 m.eq. per litre). The urinary excretion of 17-ketosteroids was 4·3 mg. in twenty-four hours (Callow method) and of P.S.H. less than 6·6 mouse units in twenty-four hours. Clearance of *p*-aminohippuric-acid determined on Feb. 3, 1953, gave a mean value of 432 ml. a minute for the two clearance periods (see table). This suggested some impairment of tubular excretory function for this substance (normal 594±102 ml. a minute) and supplied additional evidence that the renal defect predominantly affected the tubules.

The patient remained perfectly well during the ensuing twelve months, with no recurrence of the initial presenting symptoms. The large dose of potassium chloride, 8 g. thrice daily after meals, was rather trying; and, since the precise nature of the renal defect leading to the excessive urinary loss of potassium was not revealed by the previous investigations, it was thought advisable to readmit the patient for further study. It was hoped that reassessment would make possible a reduction of the maintenance dose of potassium chloride and might throw some light on the ætiology.

Second Period of Investigation

The patient was admitted to hospital on Sept. 21, 1953, for a further experimental period.

Potassium therapy was discontinued on admission, and a dietary régime was instituted which gave a calculated potassium intake of 3 g. daily. The twenty-four-hour urine was collected each day and analysed for sodium, potassium, and creatinine, which substances, and others, were also estimated in the serum according to circumstances (fig. 5).

The tests included thiosulphate and *p*-aminohippuric-acid clearances and other tests intended to assess more accurately various aspects of renal tubular function.

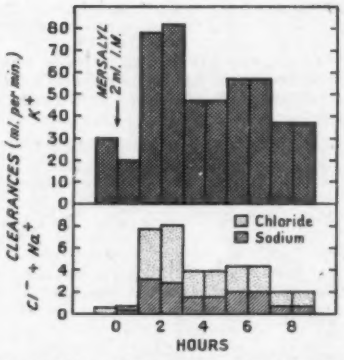

Fig. 6—Effect of intramuscular mersalyl 2 ml. on excretion-rates of potassium, sodium, and chloride.

The use of the carbonic-anhydrase inhibitor 2-acetylamino-1,3,4-thiadiazole-5-sulphonamide ('Diamox') for investigation of active tubular excretion of potassium was made possible through the kindness of Dr. F. C. Ottati of Lederle Laboratories Division.

The figures for the thiosulphate and *p*-aminohippuric-acid clearances (see table) were in substantial agreement with those obtained previously. They showed that the degree of impairment of glomerular filtration-rate was too slight to be detected with certainty, but that the *p*-aminohippuric-acid clearance was a little below the lower limit of normal. Confirmatory evidence was offered by the urea and endogenous creatinine clearances.

To determine whether the unusual excretion of potassium was due principally to a failure of tubular reabsorption or to an unusually active tubular excretion, 2 ml. of mersalyl was given intramuscularly, and the effect of this on the rate of excretion of potassium, sodium, and chloride ions was studied (fig. 6).

If it can be assumed that the mercurial inhibits all the specialised functions of the renal tubules, and if the potassium excreted in the patient's urine were mostly due to abnormal tubular excretion, it might be expected that a suitable dose of mercury might produce a recognisable fall in the excretion-rate of potassium. In the experiment shown in fig. 5 a slight initial decrease in the excretion of potassium was in fact observed, followed, however, by a very considerable rise in the excretion-rate no doubt due to reduced reabsorption in the proximal tubules. Repetition of the experiment with smaller doses invariably produced an increased excretion-rate of potassium, and hence did not separate distal tubular excretion from reabsorption in the proximal tubules. It seems that a dose of mercurial sufficient to inhibit distal tubular activity will always simultaneously reduce reabsorption in the proximal

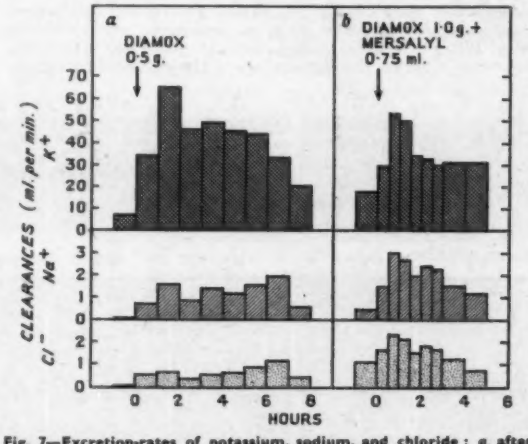

Fig. 7—Excretion-rates of potassium, sodium, and chloride: *a*, after oral diamox 500 mg.; *b*, after oral diamox 1 g. and intramuscular mersalyl 0·75 ml. given simultaneously.

tubules, the net result being either no change at all in the excretion of potassium or increased excretion due to the dominant effect on the proximal tubules. The excretion of potassium by the distal tubules is thus no more sensitive to mercurials than is the reabsorption of potassium by the proximal tubules.

A rather unexpected consequence of the use of mersalyl was that during the following five days the urinary excretion of both sodium and potassium remained exceptionally small. The resultant strongly positive potassium balance caused the serum-potassium level to rise to the lower limit of normal without any alteration in the dietary intake.

A glucose infusion was given, to investigate the maximal tubular resorptive capacity (Tm_G) for this substance. During the infusion the potassium clearance increased from 20 to 64 ml. a minute and that of sodium from 0·7 to 7·7 ml. a minute. A similar effect on the potassium excretion was found by Earle et al. (1951) in their patient, who in these circumstances excreted more potassium in the urine than could have been filtered by the glomeruli. Our patient's potassium clearance did not, however, exceed the glomerular filtration-rate at any time.

The glucose Tm calculated from two clearance periods was 239 mg. a minute.

Distal tubular function was investigated with diamox either alone or in combination with a small dose of mersalyl.

Fig. 7*a* shows the effect of 500 mg. of diamox by mouth, on the excretion of potassium, sodium, and chloride. There is clearly a very pronounced increase of potassium excretion.

Berliner et al. (1951) have shown that the production of hydrogen ions and the excretion of potassium by the distal renal tubules share a common metabolic pathway, and that interference with the production of hydrogen ions by a carbonic-anhydrase inhibitor leads to increased excretion of potassium. The increased excretion-rate of potassium after the administration of diamox in this patient can reasonably be interpreted as indicating an essentially normal distal tubular mechanism for potassium excretion.

The effect of the administration of 1 g. of diamox by mouth and the simultaneous injection of intramuscular mersalyl 0·75 ml. is shown in fig. 7*b*; it is seen that the potassium response to the diamox is reduced in magnitude and duration by the mercurial. This experiment offers confirmatory evidence that the increased excretion of potassium previously observed after the administration of diamox was due, in part at least, to active tubular excretion.

Since an oral dose of 500 mg. of diamox increases potassium clearance to a maximum of 65 ml. a minute, while the maximal potassium clearances observed normally in this patient were about 30 ml. a minute, it can also be inferred from these experiments that the capacity of this patient's kidneys for distal tubular excretion of potassium is much greater than the level of excretion normally present.

An experiment was made on the effect of oral caronamide: 3 g. two-hourly for two doses gave at the end of four hours a pronounced rise in the excretion-rate of potassium, sodium, and chloride (maximal clearances 38·0, 1·8, and 2·8 ml. a minute respectively).

At the conclusion of these tests the patient was discharged from hospital on a maintenance dose of potassium chloride 2 g. thrice daily. On this dosage she has remained perfectly well, although the follow-up serum-potassium values (fig. 4) have been a little below the normal range, and indicate that a slightly larger dosage of potassium chloride would be advisable.

Discussion

Since the publication by Brown et al. (1944) of three cases of exceseive potassium loss in chronic nephritis it has been recognised that serum-potassium levels may be low in severe renal disease.

Thus Burrows et al. (1949) found much potassium in the urine of patients with renal failure and low serum-potassium levels in some of them. Elkinton et al. (1949) reported serum-potassium levels lower than 3·5 m.eq. per litre in 4 of 26 patients with renal insufficiency, and Schoch (1951) found low serum-potassium levels in cases of advanced renal insufficiency.

In spite of the fact that renal disease leads in some cases to minor degrees of potassium depletion from excessive urinary loss, depletion severe enough to cause muscular weakness and paralysis seems to be comparatively rare.

Three additional cases (Earle et al. 1951, Kjerulf-Jensen et al. 1951, Davidsen et al. 1951) have been reported since 1944, and the patient described by Earle et al. (1951) is the only one who has been investigated in detail.

Our patient is remarkable in that the renal damage is very slight indeed compared with the cases previously published. The glomerular filtration-rate is within normal limits, and the effective renal plasma flow is only a little below the lower limit of normal. The Tm_G points to diminished reabsorptive capacity of the proximal tubules. Distal tubular function, assessed by the potassium response to a carbonic-anhydrase inhibitor, is qualitatively and roughly quantitatively normal, and there is no acidosis and no apparent failure of hydrogen-ion production and base conservation.

On the basis of our experiments we consider it probable that this patient's renal lesion consists of a mild impairment of tubular function, and that it is the diminished proximal tubular reabsorption of potassium that is responsible for the unusually large urinary losses.

There is no convincing evidence about the nature of the pathological process responsible for the renal damage. The evidence in favour of chronic pyelonephritis is inconclusive. There is no history of a urinary-tract infection, and no organisms were found on culture of two catheter specimens taken at widely separated times. The only suggestive finding is the slightly abnormal pyelogram. On the other hand, the history of persistent mild hypertension, aggravated during pregnancy, suggests that mild nephrosclerosis may be the basic renal lesion. Whatever the nature of the renal damage it has shown no detectable change in the two years during which the patient has been under close supervision.

There remains no doubt about the efficacy of potassium therapy and the absence of any other contributory lesion. Supplementary potassium caused a disappearance of her presenting symptoms and restored her electrocardiogram to normal. A point of interest was the disappearance of the constipation which had troubled her for some months before her first admission. This would be in accordance with recent reports of hypopotassæmia associated with postoperative ileus. Under potassium therapy she still has a slightly raised blood-pressure but is perfectly well and has no other clinically recognisable abnormality. When her serum-potassium level returned to normal, she lost her curious visual defect and could read and see the whole page clearly. We could not determine the cause of this defect. If weakness of the ciliary muscle had been responsible and had prevented accurate accommodation, it probably would have caused blurring of the whole field of vision; but the patient could still see a restricted central area quite well.

Comparison of the urea-clearance determinations done soon after the patient's admission with those done later showed appreciable differences which exceed the limits of experimental error. Possibly the chronic depletion of potassium before the patient's admission to hospital aggravated the renal damage, since renal lesions due to hypopotassæmia have been described. The earlier investigations (Follis et al. 1942) were done on rats and have been amply confirmed, but species differences make it impossible to apply them directly to man. In two patients dying in a state of potassium depletion (Perkins et al. 1950, Keye 1952), vacuolation of the renal tubular epithelium was found, which agrees with the results of experiments on animals; but both patients had chronic diarrhœa, and coexisting deficiencies of other substances may well have been responsible for the lesions observed. To some extent the same complicating factors are present in the findings of Schwartz and Relman

(1953), who determined the renal function of two patients in a state of potassium depletion due to the over-use of laxatives; but the improvement in renal function obtained, when the laxatives were omitted and the potassium depletion was made good, is very strong evidence that potassium depletion appreciably impairs renal function. It therefore appears likely that our patient's renal condition was aggravated by the chronic hypopotassæmia, although when the depletion was made good the original renal defect still remained.

Summary

A case of chronic hypopotassæmia with muscular paralysis due to mild renal disease is described.

Tests showed no significant abnormalities other than mild impairment of renal tubular function.

The abnormal urinary loss of potassium is probably due to reduced proximal tubular reabsorption.

Special thanks are due to the patient, who has with unfailing cheerfulness submitted to all the tests described and obeyed all the instructions given. Many members of the hospital staff have given valuable assistance in the investigation of this case, especially Sister J. Macdonald and Mrs. S. Collinson, of the biochemical laboratory.

Addendum

Recently Conn (1955) has described a new clinical syndrome which he terms primary aldosteronism. It is characterised by severe hypopotassæmia resistant to potassium therapy, alkalosis, increased serum-sodium, decreased sodium and chloride, and elevated potassium content of sweat and saliva. Conn believes this to be due to excessive secretion of aldosterone by the adrenal cortex and associated with an increase of this hormone in the urine. One such case is described by him, and he refers to other cases (Earle et al. 1951, Evans and Milne 1954, Mader and Iseri 1954, Wyngaarden et al. 1954) as examples of the same syndrome. In view of this new development, it became of some importance to determine the aldosterone excretion of the subject of this investigation, and Dr. J. G. Llaurado of the Otago University Medical School very kindly agreed to perform these assays for us. Preliminary results are suggestive of an increased excretion of aldosterone; but, since one of the controls, an apparently healthy laboratory assistant, showed similar values, the results must be regarded as inconclusive. It is hoped to pursue further studies along these lines.

While there are many points of similarity between our case and that described by Conn, pronounced differences also exist. For example, our case was not resistant to potassium therapy; symptoms were completely relieved, and the serum-potassium elevated to within the normal range, by oral potassium chloride. There was no alkalosis.

An adrenal cortical tumour was demonstrated in Conn's case, which therefore constitutes a most convincing demonstration of primary aldosteronism. Whether our case will ultimately prove to have a similar explanation must remain an open question for the present time. It appears likely, however, that cases such as those described by Wyngaarden et al. (1954) and Earle et al. (1951), and many others in which there is ample evidence of severe renal damage (frequently supported by necropsy findings, showing also apparently normal adrenal glands), offer strong evidence that excessive urinary excretion of potassium may in certain cases be due to a primary renal lesion, the excessive aldosterone production, if present, being secondary or compensatory.

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References continued at foot of next column

CERVICAL PREGNANCY

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A PRIMARY cervical pregnancy may be considered rare enough to attract attention and sufficiently interesting to report. In a search of the literature a number of cases can be found, but these have appeared almost exclusively in the foreign journals.

Case-record

A married woman, aged 20, gravida 2, had her last menstrual period on July 12, 1954. The first pregnancy had ended twenty months earlier in a normal confinement of a healthy full-term child, birth-weight 6 lb. 5 oz. (2·86 kg.). The past personal history had been uneventful. Menstruation had always been regular, occurring every twenty-eight days and lasting five to eight days.

She was admitted as an emergency to Llandough Hospital, Cardiff, on Oct. 10, 1954, because of vaginal bleeding. She said she had not felt well during this pregnancy owing to continuous vague lower abdominal pain. In the early hours of the morning before admission she had severe backache and nausea. Some four hours later at about 6 A.M., during micturition, she passed several large blood-clots per vaginam. The bleeding persisted and arrangements were made for her transfer to hospital. There had been no vomiting or urinary symptoms and the bowel function was normal.

She was a healthy young woman who did not appear acutely ill or to have lost a lot of blood. She felt very tired and was clearly distressed. The temperature was 97°F, pulse 96 per min., and blood-pressure 140/85 mm. Hg. The heart and lungs were normal. On inspection of the abdomen there was a swelling rising from the pelvis and reaching to the level of the umbilicus. This was smooth, tensely cystic, and appeared to be bilocular. The lower swelling was symmetrical resembling a distended bladder and softer than the upper mass to which it appeared to be attached. Fœtal parts were not detected and movements had not been felt. A vaginal examination after preliminary catheterisation revealed the cervix to be very full, effaced, and one finger dilated with the os in the sacral position. In the anterior fornix there was a soft tender swelling the size of a Jaffa orange, and above and to the left a firmer mass which resembled an ovarian cyst. The findings pointed to a diagnosis of inevitable abortion with a possible torsion of an ovarian cyst.

As her general condition was good and the bleeding was slight, it was decided to delay operation until the abortion had become complete. She was accordingly treated with pethidine and ergometrine and carefully observed. The following day there was a recurrence of abdominal pain, acute retention of urine developed. The bleeding was minimal and no products of conception were passed. The temperature was now 99°F, and a course of penicillin was started. The hæmoglobin was 8·6 g. per 100 ml. and the white-cell count 10,300 per c.mm. (77% polymorphs). The urine was normal microscopically.

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At this stage it was decided to examine the patient under anæsthesia and perform laparotomy if necessary. Under anæsthesia the cervix was found to be two fingers dilated. The softer pelvic tumour appeared to be the pregnant uterus to which was attached a much firmer swelling which resembled a fundal fibroid. A finger was introduced into the cervical canal and digital evacuation commenced. The membranes were bulging through the cervix and were unruptured. On exploring the cavity, the placenta was found to be occupying the ballooned out anterior portion of the cervix. Great difficulty was encountered in separating the placenta and during this process the membranes ruptured and a fœtus was extracted. At this stage the true nature of the placental implantation was detected. The cervix formed a roughly spherical cavity approximately the size of an orange, with an opening admitting the tip of the finger at its summit. This opening was the internal os with the body of the uterus clearly identified above it. A uterine sound passed through the internal os to the fundus extended for about 3 in. (7·6 cm.). There was much bleeding during removal of the placenta, which necessitated immediate packing of the cervical cavity, before curettage was even contemplated. The fœtus measured 6 in. (15·2 cm.) in total length and weighed $^1/_2$ lb. (226·8 g.).

A blood-transfusion was started and the pack left in situ for twenty-four hours. There was an irregular pyrexia up to 101°F for two days, after which the temperature became normal and remained so until the patient was discharged home on the eighth postoperative day.

Three months later the patient was seen again. She had been perfectly well since discharge from hospital and had no complaints. Menstruation had returned and was a little heavier than normal but there was no pain. Pelvic examination showed a healthy normal sized cervix with a patulous external os. The body of the uterus was retroverted and bulky, but freely mobile. The adnexa were normal.

Comment

The existence of a cervical pregnancy, a rare and unusual example of an ectopic gestation, has been recognised as a clinical entity since the end of the last century, but until lately the number of reported cases was small.

In excellent reviews of the literature, Studdiford (1945) and later Baptisti (1953) together found a total of 45 cases, including 4 of their own. More recently Flanagan and Walsh (1954) have described a further case. European literature has contained most of these reports and it is believed that the present case, the 47th to be recorded, is only the 2nd to appear in the British literature, that of Hyslop (1935) being the first.

Nearly all cervical pregnancies terminate in abortions before the twelfth week of gestation, but this is not invariable and cervical pregnancies have been carried beyond the twentieth week and almost to term. Most authors agree that hæmorrhage can be most alarming, and sometimes fatal. This is particularly so in the more advanced types, and in these cases Studdiford (1945) considers that hysterectomy may be the best line of approach.

The condition, as in this case, is seldom recognised prior to operation and no doubt many abort spontaneously and pass unnoticed. This patient presented the usual features associated with this type of pregnancy—namely, vaginal bleeding, vague lower abdominal pain, and backache. In addition there was some disturbance of micturition which culminated in acute retention, and it is surprising that this symptom is not more common. The ætiology is not known, and it is doubtful whether trauma by dislodging the ovum can play a part. It is interesting, however, to note that this particular patient did receive several severe blows in the lower part of her abdomen when she was nine weeks pregnant.

I wish to thank Mr. M. D. Arwyn Evans for his kind permission to publish this case.

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GASTRIC ATROPHY WITH SUBSEQUENT PERNICIOUS ANÆMIA AND PRONOUNCED SUBACUTE COMBINED DEGENERATION OF THE CORD

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SINCE the introduction of the flexible gastric-biopsy tube in 1949 (Wood et al.) its value in the diagnosis of subacute combined degeneration of the cord without changes in the bone-marrow or in the peripheral blood has been emphasised (Doig et al. 1950, Jewesbury 1954).

Doig and Wood (1950) reported the finding of complete gastric atrophy (Motteram 1951) in 43 of 45 cases of pernicious anæmia and/or subacute combined degeneration of the cord. The remaining 2 cases had polymorph infiltration in addition to atrophy of the gastric mucosa. On the other hand, 2 patients showed typical gastric atrophy without either disease in its florid form: 1 was a young man without symptoms, who has remained well; and the other was a man, aged 65, with a long history of indigestion, who had minimal neurological symptoms of subacute combined degeneration of the cord with no changes in the peripheral blood or in the bone-marrow. Now, five years later, this man has developed overt pernicious anæmia and subacute combined degeneration of the cord and forms the subject of this report.

Case-report

A man, aged 65, presented in February, 1949, stating that for fifty years he had had flatulent dyspepsia coming on after meals and relieved by powders. On direct questioning he admitted to occasional tingling and numbness in the sole of the left foot for three years and in the right foot for six years, but only on getting into bed at night after a full day's farm work. There was no family history of pernicious anæmia. He had received no treatment with liver extracts.

On examination his blood-pressure was 170/95 mm. Hg. Neurological assessment by one of us (E. G. R.) at that time was as follows: "Although in type the dysæsthesiæ in the feet are characteristic of subacute combined degeneration of the cord they are unusual in two respects—the duration without change, and the fact that the arms and hands are not involved as well as the legs—but neither of these points is definitely against the diagnosis. The tongue is a little pale, shiny, and rather denuded of fur. Motor power seems normal in spite of mild osteo-arthritic changes; muscular tone is normal. There is a little unsteadiness in the heel-knee test, but this is very slight. However, this has its correlation in some unsteadiness in walking. The deep reflexes are equal and active, the superficial abdominal reflexes present, and the plantar responses flexor. There appears to be some diminution of superficial sensibility below a level about 2 inches above the ankles. Appreciation of position and passive movement is very slightly defective in the left great toe, and sense of vibration is diminished over the knees and ankles, more so over the left malleolus than the right. The unusual feature, however, is that the diminution is greater over the knees than the ankles. There is no muscular tenderness. Thus it appears most probable that the patient has a mild chronic type of peripheral neuritis, and I think that it is most likely that he has an early stage of subacute combined degeneration, but at this stage no certainty exists on clinical grounds."

Investigations.—Hb 14·3 g. per 100 ml.; red cells 5,200,000 per c.mm.; white cells 7000 per c.mm.; mean corpuscular volume (M.C.V.) 85·4 c.μ; mean corpuscular Hb concentration (M.C.H.C.) 32%; barium meal normal; histamine-fast achlorhydria; Wassermann reaction negative; bone-marrow normal, no evidence of megaloblastosis, normal nucleated-cell count; gastroscopy, some atrophy seen, no evidence of peptic ulcer or neoplasm; serum-bilirubin level 0·5 mg. per 100 ml.

* Working with the aid of a grant from the National Health and Medical Research Council of Australia.

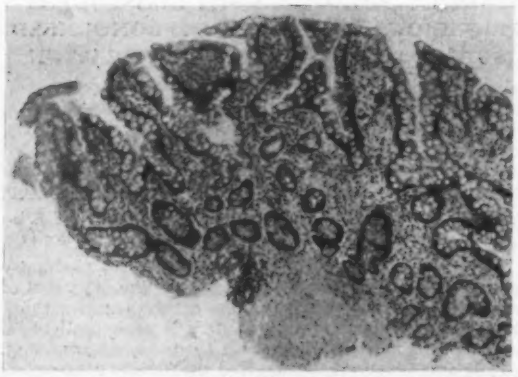

Fig. 1—Gastric biopsy on Feb. 12, 1949: mucosa villous; surface epithelium and most gastric glands contain many goblet cells; cellular infiltration of lamina propria slight. Appearances are those of gastric atrophy with intestinal metaplasia. At this stage the patient had no hæmatological or neurological evidence of vitamin-B_{12} deficiency in its florid form. (Hæmatoxylin and eosin. × 70.)

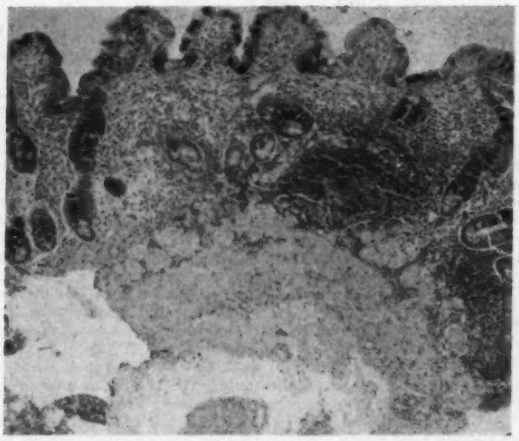

Fig. 2—Gastric biopsy on July 1, 1954: appearances unchanged. (Muci-carmine. × 70.)

Diagnosis.—In terms of modern nomenclature, as suggested by Jewesbury (1954), it would be said that the evidence favoured peripheral neuropathy due to deficiency of vitamin B_{12}. However, the ataxia was greater than would be accounted for by the degree of involvement of peripheral nerves, and this suggested the possibility of involvement of either spino-cerebellar or rubrospinal tracts in the lateral columns of the cord; but without gastric biopsy this diagnosis could only be tentative.

Subsequent Treatment.—The patient was seen periodically over the succeeding years, being admitted to hospital for review in October, 1949, September, 1951, July, 1953, and June, 1954, besides being seen frequently in the outpatient department. On all these occasions the clinical and laboratory findings were unchanged; the achlorhydria persisted, and there was no evidence of macrocytosis in either peripheral blood or bone-marrow. On June 29, 1954, examination of his blood showed Hb 12·1 g. per 100 ml., red cells 4,100,000 per c.mm., white cells 6000 per c.mm. (normal differential count). The neurological status was unchanged; indeed, on July 6, 1954, there were only minimal sensory changes. This lack of alteration in symptoms and signs raised doubts about the suggested diagnosis of subacute combined degeneration of the cord.

Deterioration.—In September, 1954, the patient wrote stating that he had muscular weakness, especially in the legs. His knees were likely to give way when he was walking, and his equilibrium was easily upset. He had "gone numb from the toes to the belt," and he found it impossible to do up the small buttons of his shirt. His immediate admission to hospital was arranged. Up to this time he had received no treatment with either liver extract or vitamin B_{12}.

On admission he stated that his flatulent dyspepsia had persisted unchanged, and that for six weeks he had noted pins-and-needles in hands and feet, associated with progressive numbness, loss of balance, and stiffness and weakness in the legs.

On examination his blood-pressure was 130/80 mm. Hg. His liver was palpable 2 cm. below the right costal margin. His spleen was impalpable. Examination of his nervous system (E. G. R.) on Sept. 29, 1954, was reported as follows: "The onset of dysæsthesiæ in the hands, although delayed and the spread from the lower limbs to the trunk (up to about the fifth thoracic dermatome) complete the clinical picture of the dysæsthesiæ of subacute combined degeneration of the cord. There is no evidence of involvement of the pyramidal tracts, although some ataxia is apparent in the lower limbs. The deep reflexes have become less active, being now almost absent. There is slight diminution of superficial sensibility over the hands and lower limbs. Appreciation of the position of his great toes is less accurate than before. He fails to feel vibration below the 10th thoracic spine. The threshold for discrimination between two points is slightly raised, but stereognosis is accurate."

Investigations.—Hb 12·4 g. per 100 ml.; red cells 3,900,000 per c.mm.; M.C.V. 97 c.μ; M.C.H.C. 32%; white cells 6000 per c.mm., with some hypersegmentation of polymorphs; barium meal normal; histamine-fast achlorhydria; sternal puncture, marrow cellular with occasional megaloblasts and giant band forms of leucocytes; serum-bilirubin level 0·1 mg. per 100 ml.; serum-vitamin B_{12} less than 0·05 μg. per ml.†

† The serum-vitamin B_{12} assay was done by Mr. L. Austin, of the department of biochemistry, University of Melbourne, using a modified microbiological method and correcting for the presence of methionine (normal by this method about 0·3 μg. per ml.).

Fig. 3—Gastric biopsy on Sept. 25, 1954, when patient first presented pronounced hæmatological and neurological evidence of vitamin-B_{12} deficiency. Appearances are those of gastric atrophy with slightly increased cellularity of lamina propria. (Hæmatoxylin and eosin. × 70.)

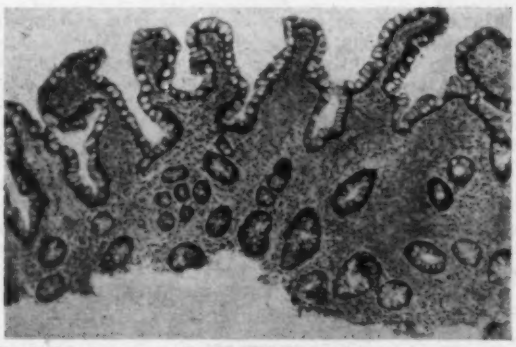

Fig. 4—Gastric biopsy on Oct. 21, 1954, after treatment with vitamin-B_{12} had alleviated manifestations of vitamin-B_{12} deficiency. Appearances unchanged—gastric atrophy with intestinal metaplasia. (Hæmatoxylin and eosin. × 70.)

Treatment with parenteral vitamin B_{12} was begun on Sept. 30, 1954, 100 μg. daily for three days and then 50 μg. daily for seventeen days. This produced a rapid and pronounced subjective response, and at the end of this course the patient was greatly improved. His Hb increased to 13·3 per 100 ml., red cells to 4,700,000 per c.mm., and reticulocytes to 1·5% on Oct. 7, 1954; and his bone-marrow was wholly normoblastic on Oct. 15, 1954. He gained 5 lb. in weight.

Follow-up.—He has remained well since and carried on his work as a gardener on regular injections of vitamin B_{12} 100 μg. monthly. When last seen, on Feb. 8, 1955, he reported that the "fuzzy-wuzzy" feelings of the lower limbs were less, and he could again do up his buttons. Examination showed slight improvement of superficial and deep sensibility and of the ataxia of his lower limbs.

Gastric biopsy was first done on Feb. 12, 1949, and showed complete gastric atrophy of pernicious anæmia type (fig. 1). The mucosa was thinned, and the surface and glandular epithelium showed "intestinal metaplasia" to a mucus-secreting type containing many goblet cells. Wandering-cell infiltration was minimal. The biopsy findings altered little in subsequent specimens obtained on Oct. 21, 1949; Feb. 9, 1950; Sept. 29, 1951; Aug. 16, 1952; July 7, 1953; July 1, 1954 (fig. 2); Sept. 25, 1954 (fig. 3); Oct. 21, 1954 (fig. 4); Feb. 10, 1955. On every occasion complete gastric atrophy with intestinal metaplasia was present, although the degree of wandering-cell infiltration of the substantia propria varied slightly over the years. The appearances were unaffected by treatment for four months with vitamin B_{12}, as would be expected from our previous experiences (Doig and Wood 1950, Finckh and Wood 1953).

Discussion

This elderly patient first reported with dyspepsia, and only minimal subjective neurological symptoms were ascertained by the physician. Investigation of his dyspepsia showed complete gastric atrophy—the classical pernicious-anæmia stomach. For this reason a detailed examination was made of the peripheral blood and bone-marrow, which showed no evidence of megaloblastosis. His dysæsthesiæ suggested the diagnosis of subacute combined degeneration of the cord, but it was impossible to state that the patient had not got some mild peripheral neuritis, even though achlorhydria was present. The finding of gastric atrophy also favoured the former diagnosis, but at that time certainty was lacking because we were only just starting our assessment of gastric biopsy. The picture was unchanged for five years, during which time the patient was given no therapy. He then developed typical symptoms and signs of both pernicious anæmia and subacute combined degeneration of the cord —vitamin-B_{12} deficiency. There was rapid response to treatment with vitamin B_{12}.

This patient thus provides evidence which strengthens our belief that gastric atrophy precedes the development of both pernicious anæmia and subacute combined degeneration of the cord in their florid forms, and encourages physicians to be watchful of the early manifestations of subacute combined degeneration of the cord, particularly dysæsthesiæ. Indeed, at this early stage gastric biopsy may be the only other positive finding, although the excellent researches of Mollin and Ross (1954) on the level of vitamin B_{12} in the serum may provide a second valuable aid in the early diagnosis of this important disease.

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New Inventions

TISSUE-FORCEPS FOR CÆSAREAN SECTION

A TISSUE-FORCEPS has been developed for use on the edges of the uterine wounds in the lower-segment cæsarean-section operation. This instrument (fig. 1) has the following features:

(1) The gripping edge is broad, so it provides hæmostasis from bleeding uterine sinuses as in the Green-Armytage forceps.

(2) The gripping surface is grooved to prevent slipping, but the action is soft so the instrument does not damage the uterine edge whence healing will occur.

(3) The instrument is angled, so the shank lies flat; this elevates the uterine wound and retracts the abdominal-wall wound, making for ease of access in suturing (fig. 2).

(4) The handles have been placed so that the bows are closer together than is usual with tissue-forceps, making the instrument neat and compact in use.

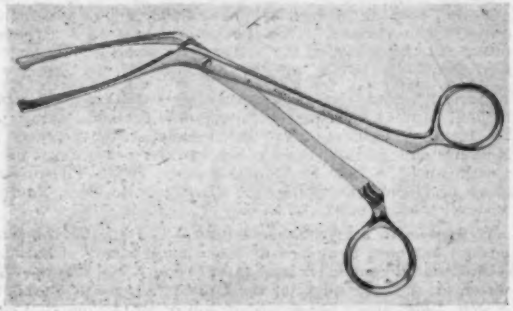

Fig. 1—The tissue-forceps.

There does not appear to be a similar instrument embodying these features. Other forceps designed for use on the uterine edge are straight and the handles have an annoying tendency to fall over to the midline, interrupting the work, requiring an assistant to steady the instrument, and failing to elevate and retract the wounds. The usual tissue-forceps have a gripping surface which is sharp and narrow, causing tissue damage and not helping hæmostasis.

The new forceps are of greatest value when placed at the lateral angles of the uterine wound, which in British practice is usually transverse in lower-segment operations. Each instrument elevates its corner, retracts the abdominal wall, and secures hæmostasis in an area where these aids are important. Control of the upper and lower wound edges in the midline is usually of lesser importance; a stay-suture, placed in the midline below the proposed lower-segment incision and before it has been made, helps to prevent retraction of the inferior wound margin and may be replaced by the forceps if hæmostasis is required, the angle of the instrument enabling it to lie conveniently out of the operator's way, over the symphysis pubis.

Fig. 2—The tissue-forceps in use.

The instrument has been specially made by Messrs. Allen & Hanburys Ltd., 48, Wigmore Street, London, W.1. I am grateful to Miss M. J. Waldron of the department of medical illustration, Guy's Hospital, for the drawing of the forceps in use.

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Reviews of Books

Surgery of the Heart

CHARLES P. BAILEY, M.D., M.SC. (med.), F.A.C.S., F.C.C.P., professor and head of the department of thoracic surgery, Hahnemann Medical College and Hospital, Philadelphia. London: Henry Kimpton. 1955. Pp. 1062. £9.

"THE road to the heart is only 2 to 3 centimetres in a direct line, but it has taken surgery nearly 2400 years to travel it . . . and it took surgery 98 years to pass from the pericardium to the epicardium, across a space that is such only potentially." This quotation from Sherman, who wrote it in 1902, is a fitting introduction to Dr. Bailey's comprehensive new work—which embodies almost every known development in cardiac surgery. His exceptional and possibly unique experience eminently qualifies him to describe and pronounce on the merits of the individual operations, and his book, though it starts conventionally with a historical survey, is essentially practical, proceeding via anæsthesia and general technical aspects to the individual lesions and their treatment. Much space is given to pathological anatomy and necessary investigations, but most of the text (admirably illustrated by line drawings) is concerned with the technique of treatment. Clinical selection and post-operative appraisal are deliberately given less attention than might be expected, since a companion volume on the medical aspects has been prepared. The chapters range in merit from outstanding ones on mitral stenosis and atrioseptal defects to a weak one on pericarditis. But the general standard is high and the book bears the stamp of a vast surgical experience: thus some 24 pages are allotted to "unexpected technical problems" encountered during the surgery of mitral stenosis. Professor Bailey would be the last person to suggest that surgery of the heart had become static; and indeed it moves so fast that some of the operations described here have been modified or discarded since the book was written. He is to be congratulated on the way in which, in the midst of a busy surgical life, he has made his experience available to others.

Viral and Rickettsial Diseases of the Skin, Eye and Mucous Membranes of Man

HARVEY BLANK, M.D., Squibb Institute for Medical Research, Columbia University, University of Pennsylvania; GEOFFREY RAKE, M.B., Wistar Institute of Anatomy and Biology, Squibb Institute for Medical Research. London: J. & A. Churchill. 1955. Pp. 285. 60*s*.

THE different diseases grouped together under this title reflect the research interests of the authors, but although the book is admirably written, it is difficult to know to whom it is addressed. Perhaps it is best suited to dermatologists (there are fewer chapters for the ophthalmologists) interested in making detailed investigations of certain virus diseases of the skin and mucous membranes. The descriptions and explanations are very clear, and little or no specialised knowledge is required of the reader. The chapters dealing with herpes simplex, chickenpox and zoster, herpangina, warts, molluscum contagiosum, and the virus diseases of the eye are all excellent, and show how expert knowledge can be translated into simple and authoritative language. One or two chapters—such as those on the exanthematous diseases and the common cold—bear less of a personal stamp and seem to be added mainly for good measure.

Man in a Cold Environment

Physiological and Pathological Effects of Exposure to Low Temperatures. ALAN C. BURTON, PH.D., professor of biophysics, University of Western Ontario; OTTO G. EDHOLM, M.B., head of division of human physiology, National Institute for Medical Research, Medical Research Council. London: Edward Arnold. 1955. Pp. 273. 30*s*.

THIS is the second of a series of monographs which are being produced at the request of the Physiological Society. There have been several books published lately on the effects of temperature, and the subject is receiving world-wide attention. This monograph, however, touches only lightly on what has already been said, and such repetition as there is is useful and illuminating: in the main, it covers new ground. Man began as a tropical animal who has steadily moved away from the hot zones of the earth, not because his powers of physiological adaptation increased, but because his intellectual development enabled him to use material things to protect himself. For man, the cold regions of the earth are, for various reasons, rapidly growing in importance; short air-routes cross the North Pole, meteorological stations are needed in polar regions, and even in temperate zones ship-wrecked or air-wrecked men still suffer cold and hardship in open boats. Hypothermia is now deliberately produced to make difficult or previously impossible operations more safe; and it is possible to maintain animal tissues at temperatures far below freezing-point for long periods, yet ensure normal survival on rewarming. Even whole animals may be kept in a state of suspended animation not far above freezing, with return to completely normal life. The great importance of these observations lies not only in pure research, but in the prospect they offer of banking of tissues in viable form, and of discovering the best methods of treatment of those suffering from exposure. They throw light, too, on the best means of clothing and housing, so that comfort and efficiency shall be maximal, both at work and rest. This involves many things, from the redesigning of the cut of gloves, to a study of why certain materials feel warm and others cold. This, in turn, may affect the whole textile industry, for it seems probable that artificial fibres, by a suitable arrangement of mesh and compressibility, can be adapted for all circumstances.

All these matters and man's reactions in many conditions are discussed in this book in a very readable way. A final chapter deals with problems for future research.

Coagulation of Blood

Methods of Study. Editor: LEANDRO M. TOCANTINS, M.D. New York and London: Grune & Stratton. 1955. Pp. 240. $5.75.

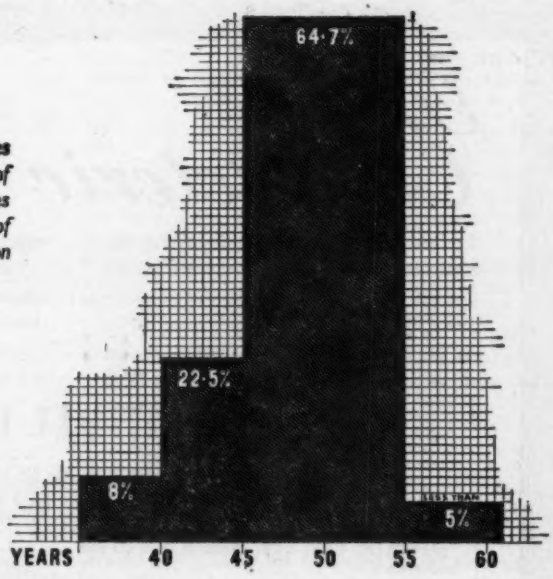
THIS laboratory manual has been compiled by a team of authors under the sponsorship of the panel on blood coagulation of the Committee on Medicine and Surgery of the National Academy of Sciences, National Research Council of the United States of America. If the criteria for a laboratory manual are that its instructions should be clear and complete, and should indicate the preferred method for any estimation and the reasons for sometimes using alternatives, this one has shortcomings: not wishing to seem to dictate "standard" methods, the authors give alternatives without any indication of their relative value or particular use. The methods, in general, seem unnecessarily complex, and not all of them are applicable in most laboratories in this country. There is a valuable section by Tocantins on the working-out of circulating anticoagulants which conveniently brings together the techniques for these studies: but, on the whole, British workers will find themselves better off with the publications already available to them.

Old Age in the Modern World (Edinburgh: E. & S. Livingstone. 1955. Pp. 647. 35*s*.).—In compiling this report of the congress of the International Association of Gerontology, held in London a year ago, the editorial committee (Dr. C. A. Boucher, Dr. O. Olbrich, Mr. W. A. Sanderson, Dr. J. H. Sheldon, Prof. R. E. Tunbridge, and Dr. Marjory Warren) have followed a policy of selection rather than compression, "giving preference to communications containing original material, opening up new avenues of thought, or presenting authoritative reviews." For the historical record a verbatim report is to be deposited in the library of the Royal Society of Medicine.

Genetics and the Inheritance of Integrated Neurological and Psychiatric Patterns.—Volume XXXIII of the Research Publications of the Association for Research in Nervous and Mental Disease reports the proceedings of a meeting held in New York in December, 1953. The preface is by Prof. Davenport Hooker. (London: Baillière, Tindall, & Cox. 1955. Pp. 425. 76*s*. 6*d*.)

Symposium on Atherosclerosis.—The report of this symposium has been published as National Academy of Sciences—National Research Council Publication 338. The meeting was held, at the request of the United States Air Force, in March, 1954, under the chairmanship of Dr. Irvine H. Page. (1955. Pp. 249. $2.)

Graph showing percentages of average age of onset of menopause, drawn from figures compiled by the Council of Medical Women's Federation in England.



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See Brit. Med. Journ. 1953 (July 25), 2.214

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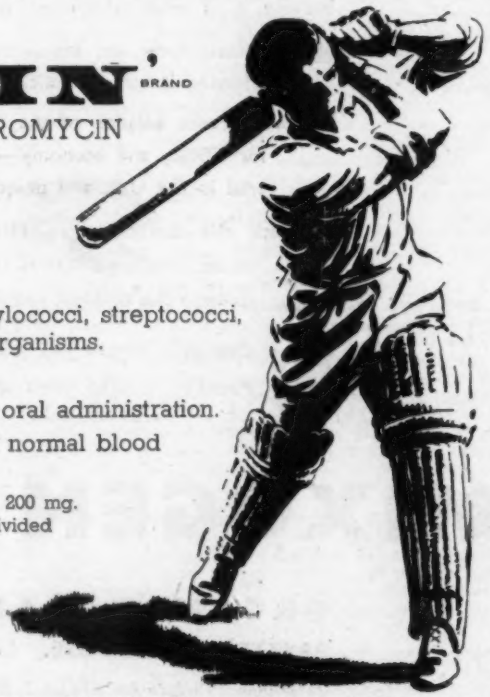

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THE LANCET

LONDON: SATURDAY, JULY 9, 1955

Hospital Buildings

THE announcement last February by the Minister of Health that an extra £17 million is to be spent on hospital buildings in the next two years [1] put a term to sixteen years' virtual standstill in construction. This long interval has been due in the first place to the war, which halted almost all work of this kind; secondly to the post-war scarcity of materials and labour, and the priority given to new houses; and latterly to the many other calls on the country's resources—including a call, still not fully answered, for new schools. Meanwhile the need for renovation and innovation has steadily mounted. It is estimated that in one region alone the cost of rebuilding the hospitals to a uniform, modern, but not extravagant, standard will be £90 million. The allocation of £17 million will do something to solve the problems arising from the redistribution of population since 1939, to reduce the gross inadequacies of mental hospitals, and to enable economy measures requiring capital outlay to be applied (see p. 85). But it does much less to finance minor capital works, the continuing restriction on which is causing anxiety to all concerned with hospitals.

Since the Appointed Day much adaptation has been undertaken at relatively low cost (about £9 million per annum); but at the present rate of progress even the existing list of much-needed minor capital works will not be worked off for many years. At many hospitals the hygienic standard in the kitchens is far below the level in industrial catering; and even after an outbreak of food-poisoning it may take a management committee two or three years to find, say, £750 for proper toilet facilities. The need is not only for replacement but also for expansion. In the past sixteen years there has been a medical, as well as an administrative, revolution in the work of hospitals, demanding reorganisation and extension, particularly of outpatient and ancillary departments. Faced with overflowing departments and insufficient accommodation for their staffs, many hospitals are greatly troubled by their situation.

Where but to the Exchequer can they turn? They are already getting valuable aid from voluntary organisations. King Edward's Hospital Fund for London, for example, has lately made a grant of £250,000 to mental hospitals; and the Duke of GLOUCESTER, the Fund's president, has remarked that "the possibility of some help from outside sources, such as leagues of friends, or from a body like the King's Fund, provides a stimulus and encouragement out of all proportion to the actual amount given" (see p. 86). Though direct appeal to the public by hospitals is, rightly, barred by statute, this does not mean that people of good will should be in any way deterred from giving or bequeathing money to them. More support of this kind might reach them if boards and committees were showing greater boldness in their use of the money already at their disposal. The distribution of free money is uneven: some hospitals have large sums, some very small. Some of those that have a good deal are applying it to urgent works that are unlikely to be paid for out of Treasury funds in the next few years; but others, reluctant to spend on any scheme that the Exchequer may eventually finance, are carefully husbanding their resources. This, we believe, is wrong. The main responsibility for hospital construction rests with the Government; but obviously the Government cannot at present patch all the many gaps, and more enterprising use of local funds would afford present comfort to patients, hearten staffs, promote local initiative, and point the way for the generous.

1. See *Lancet*, 1955, i, 410.

Stomach and Blood

THIRTY years ago, when we learnt that pernicious anæmia was due to the stomach's failure to secrete the "intrinsic factor" (hæmopoietin), it was confidently expected that a pernicious type of anæmia would develop in patients who had been subjected to partial gastrectomy. But in fact this did not happen; megaloblastic anæmia developed in only a very few such patients, and then not until perhaps eight or ten years after the operation. Thus BLAKE and RECHNITZER,[1] who reviewed the records of 50 men and 54 women who had undergone partial gastrectomy, found that, though 40% of the men and 45% of the women had iron-deficiency anæmia, only 1 woman and none of the men had a megaloblastic anæmia. The explanation is that in man the glands in the upper part of the stomach are important secretors of hæmopoietin, and this portion remains intact after all forms of partial gastrectomy. But in the past ten years total gastrectomy has been carried out, particularly for carcinoma high up in the stomach, for gastric ulcer high up on the lesser curvature, and for structural abnormalities. Because so many of the patients have carcinoma of the stomach, only some survive long enough for anæmia to become manifest, but among the survivors the incidence of anæmia is very high. BLAKE and RECHNITZER examined 10 patients who had had total gastrectomy and 8 of them were anæmic; in 6 the blood picture was macrocytic and in 3 the marrow was megaloblastic. PAULSON and HARVEY [2] examined 27 out of 80 patients who had undergone total gastrectomy at Johns Hopkins Hospital from 1944 onwards; in 23 the operation was for removal of a gastric carcinoma. Iron-deficiency anæmia appeared within two or three months of the operation, and this they

1. Blake, J., Rechnitzer, P. A. *Quart. J. Med.* 1953, **22**, 419.
2. Paulson, M., Harvey, J. C. *J. Amer. med. Ass.* 1954, **156**, 1556.

attribute to slow loss of blood from inflamed and eroded areas in the gut above and below the œsophago-jejunal anastomosis; the fæces contained occult blood, and the anæmia responded satisfactorily to oral administration of iron. Next macrocytic anæmia appeared in 12 patients between six months and two years after the operation, and in 7 more up to seven years afterwards. Finally, megaloblastic anæmia, with typical changes in bone-marrow appeared in 6 patients, between two and seven years after the gastrectomy. This anæmia responded in each case to treatment with vitamin B_{12}; but 1 patient seemed to need folic acid as well.

The fact that megaloblastic anæmia develops in all patients who survive long enough after total gastrectomy fits in with our present hypothesis that the intrinsic factor is secreted mainly in the upper part of the stomach and is essential for the proper absorption of vitamin B_{12} from the food. CALLENDER et al.[3] found that absorption of vitamin B_{12} was severely impaired after total gastrectomy. They gave small oral doses of vitamin B_{12} containing radioactive cobalt and followed the excretion of the radioactive material in the fæces. When a healthy person is given orally 0·5 μg. of this labelled vitamin B_{12}, about 30% of the Co^{60} from the vitamin is excreted in the fæces. Patients with classical pernicious anæmia given the same dose excrete about 90% of the radioactive cobalt. CALLENDER et al. gave the same dose to 8 patients who had had total gastrectomy, 6 for gastric carcinoma; 7 of these patients excreted on average 80% of the Co^{60}, representing an impairment of absorption of vitamin B_{12} of the same order as that in pernicious anæmia; the 8th patient excreted about 66% of the dose administered. The patients were then given the same dose of vitamin B_{12} together with a source of intrinsic factor prepared from pigs' gastric mucosa; the excretion in the 7 patients was reduced from 80 to 57%, and in the patient with 66% excretion the proportion improved to 29%. Thus there seems to be little doubt that total gastrectomy leads to a loss of intrinsic factor as severe as that in addisonian pernicious anæmia. In 4 of these patients the red cells showed no macrocytosis at the time of the test, but in 3 (including the 1 patient with relatively low excretion of the vitamin-B_{12} test dose) some megaloblastic change was found in the marrow.

Another way of finding out how total gastrectomy affects the absorption of vitamin B_{12} is to follow the changes in serum level. This is not easy since the method is microbiological. MOLLIN and ROSS,[4] who introduced the method using euglena, found very low serum-vitamin-B_{12} levels in 2 patients who had had total gastrectomy two years before; both patients had severe anæmia and megaloblastic marrow at the time. PITNEY and BEARD[5] followed the changes in serum-vitamin-B_{12} after total gastrectomy for carcinoma of the stomach and found that for eight months serum-B_{12} levels remained in the normal range, though they were falling; after eight months the level was subnormal, and at sixteen months the level was as low as in pernicious anæmia. But the patient still had no megaloblastic anæmia, nor had this appeared when metastases caused her death nineteen months after the operation. This variable latent period between the failure of vitamin-B_{12} absorption and the appearance of megaloblastic anæmia may be due to variation in the vitamin-B_{12} stores in the body. GIRDWOOD[6] has estimated from assays of normal human tissue that there may be 1000–2000 μg. of vitamin B_{12} stored in the body of a person with normal nutrition; and if the daily requirement of vitamin B_{12} is of the order of 1 μg., the latent period may clearly amount to years. This latent period has been recognised during the natural development of pernicious anæmia. On p. 69 of this issue Dr. GRAEME ROBERTSON and his colleagues record the case of a man who had a gastric biopsy carried out in 1949 because of dyspepsia and paræsthesiæ in the feet in the absence of any anæmia. The biopsy showed complete gastric atrophy of the pernicious-anæmia type, and repeated examinations at intervals over the next six years showed no significant change. Five years after the first biopsy typical pernicious anæmia developed, with ataxia and depressed reflexes in the legs; and this responded well to treatment with parenteral vitamin B_{12}. PAULSON and HARVEY[2] noted that the jejunal mucosa atrophied in some patients after total gastrectomy, and they suggest that this may also play a part in the precipitation of anæmia in these patients. All this information warns us that megaloblastic anæmia will certainly follow total gastrectomy if the patients survive long enough, though the latent period may be a year or more. Since the level of vitamin B_{12} in the blood falls after a few months there is a good case for treating these patients with regular parenteral vitamin B_{12} as a measure of prevention.

Another quite distinct set of researches involving studies of the blood and the stomach connect gastric lesions with blood-groups. AIRD and his colleagues reported figures which showed that patients with gastric cancer were more often in group A than would be expected from the normal distribution of blood-groups,[7] whereas patients with peptic ulcer showed a preponderance of group O.[8] On p. 52 of this issue Dr. KØSTER and his colleagues report a similar investigation in Denmark Of the patients with duodenal ulcer 50·2% were in group O and 38·4% in group A; and of the patients with gastric cancer associated with achlorhydria 33·2% were in group O and 56·4% in group A. The distribution of blood-groups in the general population of Copenhagen, according to a recent survey by BRYDE ANDERSEN, is group O 40·6%, group A 44·0%, group B 10·9%, and group AB 4·5%. As KØSTER and his colleagues graphically show, the shift from disorders associated with the greatest to the least gastric output of hydrochloric acid is accompanied by a decreasing frequency of group O and an increasing frequency of group A. The results suggest that there is a genetic factor in the incidence of gastric cancer and of peptic ulcer, and there may be a link with pernicious anæmia since there is now considerable evidence that gastric cancer is unusually common in patients with pernicious

3. Callender, S., Turnbull, A., Wakisaka, G. *Clin. Sci*, 1954, **13**, 221.
4. Mollin, D. L., Ross, G. I. M. *J. clin. Path.* 1952, **5**, 129.
5. Pitney, W. R., Beard, M. F. *Arch. intern. Med.* 1955, **95**, 591.
6. Girdwood, R. H. *Biochem. J.* 1952, **52**, 58.
7. Aird, I., Bentall, H. H., Roberts, J. A. F. *Brit. med. J.* 1953, **i**, 799.
8. Aird, I., Bentall, H. H., Mehigan, J. A., Roberts, J. A. F. *Ibid*, 1954, **ii**, 315.

anæmia and possibly in their relatives too.[9] The next step should perhaps be to make an extensive survey of the distribution of blood-groups in patients with pernicious anæmia and in persons with achlorhydria. With regard to achlorhydria, RAPPAPORT's[10] warning should be borne in mind: achlorhydria should not be diagnosed unless it is histamine-fast; and by this criterion it is quite uncommon before the fifth decade of life.

Trophisms and Tumours

KNOWLEDGE of the stimulating and restraining action of trophic hormones on normal reactive tissues is being applied with increasing frequency and enterprise to the treatment of tumours derived from responsive or "target" cells. The original impetus given at the end of last century to the idea of therapy by surgical removal of an organ with trophic properties—the ovary for breast cancer, and the testis for prostatic hypertrophy—was not long sustained but was superseded by improved surgical techniques for excising the diseased organ and by radiotherapy for cancer. The recent revival of the idea of removing a trophic influence is due to HUGGINS and his collaborators,[11 12] who extended it by using an antagonistic hormone which might be expected to have an effect equivalent to castration. By that time stilbœstrol, which has properties akin to ovarian œstrogens, had been synthesised by DODDS. Alone, or combined with orchidectomy, stilbœstrol commonly brings about striking improvement in subjective symptoms and in signs, including shrinkage of primary and metastatic growths of the prostate. Furthermore in postmenopausal patients with breast cancer about 20% derive great benefit from stilbœstrol. The mechanism of stilbœstrol's action is unknown; and in neither disease can a favourable response be predicted. Attention next centred on the adrenal gland, which is another source of gonadal hormones. HUGGINS and BERGENSTAL[13] introduced adrenalectomy, with or without gonadectomy, for prostatic and breast cancer.[14] The anterior lobe of the pituitary gland is the ultimate source of many trophic hormones, and hypophysectomy and destruction by implanted radon seeds have now been added to the treatments of breast cancer. HUGGINS has expressed the hope that eventually these drastic operations will be succeeded by nothing worse than a swallowed pill. Realisation of such a hope depends on the extraction in quantity or the synthesis of trophic hormones and on more precise information about their actions and interactions. Tests of administered trophins may be complicated by the development of antihormones; for those derived from the hypophysis are protein in nature. It may require an injection rather than a pill to put all anterior-pituitary cells out of production.

What kind of success can be expected? So far only palliation has been claimed, but with a complete set of the pure substances greater or different effects may emerge. There is also the possibility of cancer prevention. It is still not known how the very substantial regression which does sometimes occur is brought about. BIELSCHOWSKY[15] reviews some of the few morphological descriptions of sites of tumour regression after hormone therapy. He laments the paucity of adequate accounts, from which much might be learnt. So far as can be gathered, there is a lytic or possibly hydropic degeneration in some neoplastic prostatic cells, squamous metaplasia in others, and no apparent constant specific change in those which appear to remain viable. Connective tissue is often converted from dense collagen to more delicate-fibred, loosely constructed tissue. The dual responses of cells to trophic hormones—by secretion or cell proliferation—should be borne in mind. The lytic or hydropic appearance often resembles post-secretory exhaustion.

Pursuit of these ideas experimentally has not proved successful. HORNING[16] studied grafts of a chemically induced prostatic adenocarcinoma in mice, which were treated with stilbœstrol by implantation of pellets. Development of the neoplasms was retarded, compared with those in untreated control mice; but none regressed completely. The neoplasms were, however, dependent on androgen, for they failed to grow in young castrated males. In contrast with failure to cause regression, it is often possible to influence the evolution of animal tumours. A considerable variety of growths may now be provoked by hormones and other carcinogens. Some of these remain benign; others depend for continued existence or increase in aggressive properties on the hormone or other substance that first caused their appearance, or even on a non-carcinogenic agent; others again are autonomous from the start.[17 18] The interaction of thyroxine deficiency and thyroid-stimulating hormone in spontaneous and experimental tumours of the parent organs are most instructive in revealing what BIELSCHOWSKY describes as the internal environment of neoplasia. Here, it might have been supposed, is a well-developed field for testing the efficacy of treatment by hormonal trophisms and antagonisms. It is, moreover, one in which quantitative observations can be attempted. Yet no experiments appear to have been made on malignant tumours beyond the stage of dependence, save for one clinical case treated beneficially with thyroxine after administration of radio-iodine.[19] The hope is that the condition of dependence so readily demonstrable in the evolution of animal tumours is a feature in the evolution of cancer in man—and that it might be exploited to prevent or arrest the disease. Carcinoma of the thyroid is probably largely prevented now, just as goitres are, in goitrous districts where thyroxine secretion is maintained at adequate levels by means of iodine. But the existence of dependence in human tumours, similar to that in animals, has yet to be proved. The pathological responses to trophic hormones (in contrast with their morphogenic and physiological reactions) differ so greatly between species and even between individuals in the same inbred strain that their character in man can probably be judged only by observations in man.

9. *Lancet*, 1954, ii, 1215.
10. Rappaport, E. M. *New Engl. J. Med.* 1955, **252**, 802.
11. Huggins, C., Stevens, R. E. *J. Urol.* 1940, **43**, 705.
12. Huggins, C., Stevens, R. E., Hodges, C. V. *Arch. Surg., Chicago*, 1941, **43**, 209.
13. Huggins, C., Bergenstal, D. M. *Cancer Res.* 1952, **12**, 134.
14. See Pyrah, L. N., Smiddy, F. G. *Lancet*, 1954, i, 1041.
15. Bielschowsky, F. *Brit. J. Cancer*, 1955, **9**, 80.
16. Horning, E. S. *Ibid*, 1949, **3**, 211.
17. Foulds, L. *Cancer Res.* 1954, **14**, 327.
18. Furth, J. *Ibid*, 1953, **13**, 477.
19. Balme, H. W. *Lancet*, 1954, i, 812.

Annotations

TIME AND THE MENTAL NURSE

"The ward of the mental hospital is life, and the mental nurse—perhaps unknowingly—is endeavouring to help the patients to live more fully and to raise themselves above the circumstances of their disease. The job is therefore one of tact, affection and skill in dealing with individuals and, as the observers saw it, this is the prime work of the mental nurse, surpassing in importance the functional duties recorded from minute to minute on the observation sheet."

IN thus summing up the mental nurse's work, Mr. H. A. Goddard and his team of observers are saying again what we all know but are sometimes apt to ignore—that the essential quality of good nursing, and perhaps especially of good mental nursing, cannot be trapped in an analysis of the way the nurse spends her time, however carefully this is done. Mr. Goddard's job-analyses, as we know from his report [1] on the work of nurses in general hospitals, are very carefully done indeed. His new analysis, *The Work of the Mental Nurse*,[2] undertaken at the request of a joint committee of the Manchester Regional Hospital Board and the University of Manchester, is likely to prove as useful as its forerunner: for the way the mental nurse is required to spend her time can either enhance or handicap her tact, affection, and skill: the ponderables, for better or worse, influence the imponderables.

Work in 19 wards of three hospitals (two for mental defectives and one for mentally ill patients) was studied, and a list was made of 89 activities which could be grouped under the headings of administration and organisation, nursing, supervision, and domestic work. As usual a close analysis of activities reveals some surprises. For instance, the amount of "passive supervision"—that is supervision apart from any other activity—turns out to be much greater in male wards than in female wards; and suggests the question, "Is all this supervision really necessary?" It might be supposed that male patients were more troublesome, or more difficult to restrain in moments of excitement, than female patients: but there was no evidence that this was so: "unexpected behaviour specifically due to the mental illness of patients is relatively unimportant in the ordinary work of the ward." It may be, Mr. Goddard suggests, that female patients need less supervision than male patients, or it may be that there is a temperamental difference between male and female nurses, the females being more inclined to look for and find some occupation about the ward. But, he argues, whatever the reason, if so much passive or custodial supervision by trained nurses turns out to be unnecessary, then some nurses could be released from this occupation for other work; and moreover some of the time given to "passive" supervision could be spared for "active" supervision of skilled activities of a therapeutic type. This, he suggests, is one of the central problems of mental nursing, and merits careful consideration.

Less surprising are his findings that the formal training received by the student mental nurse bears little relation to the job of the trained nurse; that her daily duties do little to prepare her for the preliminary State examination; that the amount of practical tuition given to her on the wards amounted in no case to more than five minutes a day; and that the allocation of duties to her was dictated solely by administrative necessity. Mr. A. N. Oppenheim and Miss Beryl Eelman, in their review of the training of nurses at Bethlem Royal and the Maudsley Hospitals,[3] also made it plain how ill the preliminary state examination serves the needs of the student mental nurse. "Mental nursing," Mr. Goddard suggests, "is such an important subject in its own right that it demands a scheme of training formulated expressly for its own purpose." We fully agree with him.

For four hours of the day, his team found, the staffing of the wards is at half-strength; and, owing to the arrangement of mealtimes for staff and patients, these four hours fall at times when the concentration of patients in the wards is at its peak. If mealtimes could be so distributed that all the staff were on the ward from 8–9 A.M. and from 12.30–2 P.M. many routine tasks—such as bathing and haircutting, which are difficult to complete in wards where patients are out at work all day—could be done more easily, and (he suggests in disquieting italics) *possibly more often*. All the nurses worked on the "long day" system, which gives them an average of two full days or more off duty every week, but also means that they work a span of 7 A.M. to 7–8 P.M. on most of the other days. The strain of this long stretch of exacting work begins to tell on their tempers by the end of the day; and Mr. Goddard urges the adoption of one of various possible shift systems. Such systems have obvious advantages, but many nurses feel these would not outweigh the opportunity the present arrangement gives them of getting away from the hospital for a night, or two nights, every week. In view of the nature of their work it ought to be possible to offer them both a night off weekly and a shorter daily span; but while they remain so scarce and precious this apparently cannot be done. Nevertheless, with better economy in the use of trained staff, with the fullest possible use of nursing assistants (who should be given a good practical training) and part-time staff, and with better selection of student nurses, some reduction in the strain should be possible. Immediate ways of cutting down work, Mr. Goddard points out, would be to make drastic revisions of unnecessary secretarial work done in the wards, and to organise the disposal of soiled linen so that it does not need to be counted by five or six different people every time it goes to the wash. (A method which avoids all such counting has, in fact, been long in use at the London Hospital, and might well be universally copied.) Stocktaking could also be simplified by setting up a central linen store and cutting down the vast stocks of unused clothing kept in some wards. Finally, a vast amount of distasteful work caused by the incontinence of patients could be greatly reduced by forming groups of patients for habit training.

Such reforms as these can only come from within the hospitals. We support Mr. Goddard in urging every mental hospital now suffering from shortage of staff to review the work, and the way it is done, with the aims of getting rid of unnecessary tasks, using trained staff to better advantage, and encouraging students to think well of mental nursing as a career.

1. The Work of Nurses in Hospital Wards. Nuffield Provincial Hospitals Trust. 1953. See *Lancet*, 1953, i, 379.
2. Manchester University Press. 1955. Pp. 154. 10*s*.
3. The Function and Training of Mental Nurses. London, 1955. See also *Lancet*, 1955, i, 753.

INVASIVE TUMOURS OF THE PITUITARY GLAND

PITUITARY adenomas are generally described as simple expanding lesions. Few metastasising neoplasms of the pituitary have been described, and those which have been reported have not been accepted as such by critical reviewers.[1 2] But spread by the cerebrospinal fluid only has been recorded by Cairns and Russell [3]; and a well-defined group of locally invasive lesions has been recorded. These were termed "invasive adenomas" by Sir Geoffrey Jefferson, F.R.S., in his Sherrington lecture.[4]

1. Willis, R. A. The Pathology of Tumours. London, 1953; p. 626.
2. Winkelman, N. W., Cassel, C., Schlesinger, B. *J. Neuropath.* 1952, **11**, 149.
3. Cairns, H. W. B., Russell, D. S. *Brain*. 1931, **54**, 377.
4. The Invasive Adenomas of the Anterior Pituitary. By Sir GEOFFREY JEFFERSON, M.S. Lond., F.R.C.S., F.R.S., emeritus professor of neurosurgery, University of Manchester. Liverpool: University Press. 1955. Pp. 63. 5*s*.

These are not common tumours—Jefferson suggests that they account for about 10% of all pituitary tumours—but their recognition is important since surgical treatment of them is hazardous and unsuccessful. They do not necessarily grow very quickly, the duration of the illness varying from three months to seventeen years; and there are no distant metastases. In the case published by Spark and Biller [5] the patient survived for twenty years, although evidence of invasiveness was present two years after the onset.

Symptoms indicating this kind of adenoma are trigeminal pain and hypo-æsthesia or anæsthesia, and involvement of the oculomotor nerves; when these are present the tumour is nearly certainly invasive. Papilloedema is significant (since atrophy from direct pressure on the optic nerve is the rule in pituitary tumours) and so is monocular blindness. Though these tumours are more often chromophobe than acidophil, they give rise to acromegalic features more commonly than do ordinary pituitary tumours.

NEW JOBS FOR THE OLD

WHENEVER we urge the elderly not to retire at the first pensionable moment, but to carry on with their jobs—or perhaps with less exacting jobs—we should have in mind what jobs are appropriate for them, and whether there are enough of these to go round. In a first report on "alternative work in later life" [6] made for the Nuffield Foundation, Mr. Le Gros Clark and Miss Dunne have extracted from successive census reports figures showing the drift of men into certain occupations in later life. The 16 occupations examined are known to be some of those into which older men move; and fuller details about them were sought from the industries and offices which offer them.

They included watchmen, office cleaners, estate labourers, caretakers, lift attendants, gardeners, hall and hotel porters, lodging-house and boarding-house keepers, kitchen hands, messengers, "other railway workers" (that is to say, carriage-cleaners, point-oilers, toolmen, lampsmen, turntable men, and washing-machine men), "other road transport workers" (including bath-chair attendants, car-park attendants, cartage checkers, toll-men, and pointsmen), "others in personal service" (a mixed company of arcade, playground, beach, lavatory, and chair attendants, domestic handymen, lodge-keepers and others), and "porters not elsewhere specified" (that is, porters other than railway, hall, and hospital porters—a group which includes various market porters, barrow porters, outside porters, warehouse porters, and the like).

In 1951 these occupations employed between them 546,700 men—a very small proportion of the 15 million occupied males in the country; but the proportion of men over 55 in these occupations was unusually high: 37% as against 17% of men of this age in the total occupied male population. These are not the only jobs, however, into which men move when they are growing elderly: concealed within the census tables, as the authors say, there must be many light labouring and packing jobs which are being done by elderly men: indeed, it must be so, for a calculation based on their figures suggests that there must be four times as many men over 55 at work in other occupations as there are in the 16 they have selected for examination. It looks, in fact, as though employers are finding suitable jobs for many men over 55. From the country's point of view, this is not perhaps of great moment, however, since most men go on working anyhow till they are pensionable at 65. What we need to know is the proportion of men aged 65 who would like to go on working but are unable to find an appropriate job. This study shows that some men move, after middle life, into occupations, such as the 16 examined, where they can hope to continue till retiring age and perhaps beyond it. Perhaps by taking thought we could, by offering others clear opportunities to make such moves, help them too to prolong their working lives.

CONGENITAL GALACTOSÆMIA

CONGENITAL galactosæmia is remarkable as perhaps the only true state in which the mother's milk is poisonous to her child. It is also one of the few disorders in which knowledge of the genetic risks within a family may lead to early and effective treatment. The first report of this disorder in Britain appeared in 1952,[1] over twenty-five years after Goppert's [2] clear description. It is now certain that most cases have been missed; even now when the diagnosis is made it is not unusual to find that an elder brother or sister probably died from the same condition unrecognised.[3 4]

Essentially the illness consists in a partial failure to metabolise the galactose, with a consequent rise in blood-galactose and its appearance in the urine. The clinical manifestations are uniform in type but varied in degree. Failure to thrive, liver enlargement, galactosuria, and albuminuria are constant findings; mental retardation, cataract, jaundice, amino-aciduria, and a tendency to bleed are also common. The symptoms and signs are probably directly due to the effect of the galactosæmia; and Cusworth et al.[5] have shown that this is also true of the amino-aciduria. Usually a lactose-free diet leads to rapid improvement. But cases have been recorded in which even early treatment was unsuccessful. In 1 of these cases, treatment was begun on the fourteenth day, but despite initial improvement a decline set in and the child died eight weeks later; in this child the amino-aciduria never disappeared.[4] Other children have remained mentally retarded despite early treatment.[6 7] This has led to the suggestion that the mental defect may be an independent feature of the condition. But Komrower and Holzel [8] note that the milk preparation commonly used in "lactose-free" diets unfortunately contained a small amount of lactose. Mr. Salt and his colleagues [9] and Dr. Matheson [10] have had satisfactory results with a low-lactose synthetic milk powder prepared in this country. On the other hand, Dr. Holzel and his colleagues, whose letter appears in this issue, are not convinced that this powder is entirely satisfactory and they suggest an alternative feeding formula.

Early diagnosis is of the greatest importance, and full understanding of the genetics of the condition would be a powerful aid. "An inborn error of metabolism" is prima facie likely to be due to a recessive gene. Cox and Pugh [4] noted that the published reports and the families of their own cases were consistent with this mode of inheritance on the assumption that many workers had not asked about cousin marriages between the parents, and that the high proportion of sibs affected is due to the greater ease with which the diagnosis is made in families with several affected children. Holzel and Komrower [11] reported a family study in which

5. Spark, C., Biller, S. B. *Arch. Path. (Lab. Med.)*, 1943, **35**, 93.
6. New Jobs for Old Workers. By F. LE GROS CLARK and AGNES C. DUNNE. From the Nuffield Foundation, Nuffield Lodge, Regent's Park, London, N.W.1. 1955. Pp. 19. A limited number of copies can be obtained free of charge.

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5. Cusworth, D. C., Dent, C. E., Flynn, F. V. *Arch. Dis. Childh.* 1955, **30**, 150.
6. Townsend, E. H., Mason, H. H., Strong, P. S. *Pediatrics*, 1951, **7**, 760.
7. Clay, P. R., Potter, C. T. *Arch. Dis. Childh.* 1955, **30**, 147.
8. Komrower, G. M., Holzel, A. *Brit. med. J.* 1954, ii, 810.
9. Salt, H. B., Ross, C. A. C., Gerrard, J. W. *Lancet*, 1955, i. 1177.
10. Matheson, W. J. *Ibid*, July 2, 1955, p. 41.
11. Holzel, A., Komrower, G. M. *Arch. Dis. Childh.* 1955, **30**, 155.

they applied galactose-tolerance tests, by MacLagan's [12] method, to the near relations of their patients. In all the five families studied at least one parent had an abnormal lactose tolerance, but in only one family were both parents abnormal in this respect. One pair of parents were first cousins, but only one parent was abnormal on the test. Of six clinically unaffected sibs, three were found to have abnormal galactose tolerance. These findings do not accord with the hypothesis that galactosæmia is due to the homozygous state of the gene which in the heterozygous state produces only an abnormal galactose tolerance, since the hypothesis requires that both parents should be heterozygotes in nearly every case. But the response of healthy people to a test-dose of galactose varies greatly, and possibly the test is too insensitive. Further progress should come when the responsible enzyme deficiency has been detected. Schwarz et al.[13] have reported a first step in this direction. They found that the red blood-cells of galactosæmic children after a milk feed showed accumulation of galactose–1–phosphate but no increase in glucose–1–phosphate, suggesting a failure to transform the former substance to the latter. In that event it would be phospho-galacto-isomerase whose function is deficient. Even now there seems to be good grounds for hoping that in time it will be possible to pick out the parental couples at risk before the first affected child has been born.

DIABETES AND GLYCOGEN STORAGE IN THE LIVER

Winston Evans, Littler, and Pemberton [14] have described 4 diabetics who stood out from the remaining 800 in their clinic by exhibiting characteristics of what seems to be a new syndrome. All 4 were young, "brittle" diabetics (the oldest was 25) with large livers, shown to be full of glycogen, and a pronounced tendency to hypoglycæmia. It is already well known that hepatomegaly is common in young unstable diabetics, but at necropsy in such cases the liver is found to be distended with fat rather than with glycogen. Hæmochromatosis is another (though rare) cause of hepatomegaly in diabetics, but one for which there was no evidence in these 4 cases. Experimental work on diabetic animals [15] has usually shown that the level of liver-glycogen falls in states of insulin deficiency; but this is not necessarily so in man.[16] Where normal or high liver-glycogen co-exists with insulin lack, the associated hyperglycæmia may be responsible for the high glycogen level.[15] Hyperglycæmia may have played a part, too, in raising the liver glycogen of the 4 patients described by Winston Evans and his colleagues, but the tendency to hypoglycæmia is unexplained. Insulin favours glycogen synthesis and these 4 patients had large doses of insulin; yet this does not seem a reasonable explanation of the excess liver-glycogen, for this is not characteristically found in cases of insulin-secreting adenoma of the pancreas. In 1 of the 4 cases laparotomy was performed to examine the pancreas, but the result was negative.

This syndrome has features in common with the classical glycogen-storage disease of von Gierke—namely, the large liver filled with glycogen and the tendency to hypoglycæmia—but, unlike the state in von Gierke's syndrome, there was no fasting hypoglycæmia or raised blood-cholesterol. The possibility that the liver glycogen was abnormally stable, as it is in glycogen-storage disease, was tested by intravenous infusions, in 3 of the cases, of glucagon according to the technique of Kirtley and his group,[17 18] and in fact the blood-sugar level rose little. Results of adrenaline tests are unfortunately not given. The possibility therefore remains that the tendency to hypoglycæmia was due to inadequate glycogenolysis. It would be of great interest in such cases to make detailed studies of the glycogen, as has been done by Cori [19] and Andersen [20] in glycogen-storage disease. These diabetics may have a similar structurally abnormal liver glycogen [20] or lack a specific enzyme, such as glucose-6-phosphatase,[18] necessary for glycogen breakdown.

12. MacLagan, N. F. *Quart. J. Med.* 1940, **9**, 151.
13. Schwarz, V., Solberg, L., Komrower, G. M., Holzel, A. *Biochem. J.* 1955, **59**, xxii.
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21. *Hospital*, June, 1955, p. 395.

RECRUITMENT OF HOSPITAL ADMINISTRATORS

THE present standard of hospital administration is uneven, and a working party of the Hospital Discussion Group suggest [21] that too little is being done to secure men and women capable of undertaking successfully its varied duties and responsibilities. More should be done, for instance, to attract university graduates, and to offer them prospects comparable with those of other branches of public service, if not of industry. Senior appointments should not of course be reserved exclusively for graduates, for opportunities and encouragement should be given to those who enter the hospital world straight from school, and to some senior entrants who join it from other walks of life. But at present recruitment from the universities is almost at a standstill, and the hospital service will suffer if this is not remedied.

If graduates are to be recruited, then special measures (the working party say) must be taken to train them. Possibly King Edward's Hospital Fund, with the Institute of Hospital Administrators, might organise a three-year training scheme for which candidates would be selected by a panel representative of hospital authorities and of the medical profession. The number selected would be related to the number of senior posts—estimated at about 20—likely to fall vacant each year, and the competition for vacancies would be open to those within the service as well as to new entrants from universities or elsewhere.

Hospital administration will always be chosen as a career partly for the satisfaction that the job gives, but it would be unrealistic to try to improve recruitment and training without considering the range of salaries offered. There are now, it is stated, some 430 senior posts, with salary maxima ranging from £1095 to £2400 a year, the 22 secretaries of undergraduate teaching hospitals being the only officers at the top of the scale. Before the start of the National Health Service a few posts carried salaries which would now be worth over £3000. These have been brought within the new salary structure at considerably lower rates, while the general level of salary scales has been progressively depressed until the maximum salary in the service is well below the higher ranges of the Civil Service, local government, or the national boards. Inevitably able young men will think long and hard before entering the hospital world, while many already in the service may begin to look elsewhere. The working party feel that these relatively low scales are due at least in part to the organisation of the Administrative and Clerical Whitley Council, in which the management side is largely dominated by the Ministries and the staff side by local-government and

trade-union organisations, whose hospital membership is an unimportant fraction of their total strength. The solution here, they believe, lies in a reassessment by the Ministry of Health of the real nature and responsibilities of hospital administration, and in splitting the Whitley Council into two sections, the staff side of the administrative section giving representation to organisations with a substantial membership of senior hospital officers.

Administrators in all walks of life expect more criticism than thanks for their efforts, and some critics, dissatisfied already with hospital and health-service administration, may dismiss the working party's report as a piece of special pleading for still bigger and better empires for bureaucrats. Yet, as the report points out, the lower the quality of hospital administrators, the greater is the danger of the growth of impersonal bureaucracy and centralised control, and if we want a better service we must be prepared to plan for it, and, if need be, pay for it.

ARTIFICIAL RESPIRATION BY INTERMITTENT POSITIVE PRESSURE

As long ago as 1815 Waterton paralysed an ass with curare and kept it alive by inserting a bellows into its trachea, so administering artificial respiration by intermittent positive pressure. The same principle, using less homely apparatus, has been used for decades to maintain respiration in experimental animals. It is therefore astonishing that it was not until the epidemic of poliomyelitis in Denmark in 1952 that intermittent positive-pressure respiration (I.P.P.R.) was used in the treatment of respiratory paralysis in man.

The technique of I.P.P.R. for this purpose, at first a brilliant improvisation,[1] is now becoming established,[2–4] and at a recent meeting of the section of otology and laryngology of the Royal Society of Medicine at Cambridge on June 17 this subject was discussed and the experience of the Oxford respiration unit, directed by Dr. W. Ritchie Russell, was reported. Dr. A. Crampton Smith described three types of patient who were liable to die from acute paralysis. First, there is the patient with paralysis of swallowing, often referred to by the more general term, "bulbar" paralysis. If this patient is nursed sitting up or lying supine secretions inevitably and continuously trickle down his trachea with fatal consequences. He must be treated by postural drainage in the prone or semi-prone position, and in difficult cases a tracheotomy may also be required to maintain a clear airway. Second, there is the patient with paralysis of the respiratory muscles. He should be treated in a tank respirator and, to minimise the risk of inhalation of vomit, it may be advisable during the acute illness to aspirate the stomach through a nasal tube. Third, there is the patient in whom paralysis of swallowing and of respiration are combined. In this case the health of the lungs cannot be maintained in a tank respirator, even with postural drainage, for the uncompromising inspiration provided by the machine causes secretions and, worse still, vomit to be inhaled. It is the combination of paralysis of respiration and of swallowing that is the absolute indication for I.P.P.R. Air is blown into the lungs by a cuffed tracheal tube passed through a tracheostome, and the safety of the method lies in the fact that the inflated cuff not only makes an airtight seal which enables ventilation to be provided easily but it also prevents secretions or vomit in the pharynx from reaching the lungs.

The patient with respiratory weakness who is treated in a tank respirator is in grave danger if swallowing becomes paralysed. I.P.P.R. must be instituted as soon as paralysis of swallowing is detected, but there will often be a slight delay before arrangements can be completed for tracheotomy. During that period a cuffed endotracheal tube should be passed to guard the lungs against vomit or secretions. Similarly, when a patient is being treated for paralysis of swallowing, respiratory power must be tested regularly. This can be done either by measuring the vital capacity with a spirometer, or by making the patient take a deep breath and count as far as he can. A normal subject can count up to 60 in a single breath.

It is agreed on both sides of the Atlantic that tracheotomy is called for in the patient who has paralysis of both respiration and swallowing; but American practice is to keep the patient in a tank respirator even with a tracheostome.[5] The disadvantages of this are obvious compared with I.P.P.R.: the tracheostome interferes with the neck seal, access to the patient for nursing and physiotherapy is difficult, and changes of the patient's posture are limited. Moreover, tank respirators are many times more expensive than apparatus for I.P.P.R. There is, on the other hand, no compensatory advantage in using a tank respirator in the presence of a tracheostome, and indeed, as Bower[5] has pointed out, it is physiologically identical with I.P.P.R. No doubt the Americans continue to use tank respirators in these circumstances because they naturally like to exploit to the full the extraordinary skill that the best American centres have acquired in their management.

Will I.P.P.R. supplant the tank respirator? Though some Scandinavian opinion seems inclined to think that it will, it is difficult to accept this view at present; for a tracheostome, life-saving though it is in some circumstances, brings certain difficulties with it. It makes chest infections much more common, and this is not altogether offset by the fact that it also renders them easier to treat. Moreover, for the patient whose ultimate respiratory recovery is poor the closure of the tracheostome may present serious difficulties and dangers because of his inability to cough.

At the Cambridge meeting Dr. J. M. K. Spalding reported the results obtained at Oxford by treatment with I.P.P.R. Prolonged artificial respiration is often thought of in terms of poliomyelitis, but it is striking that of 11 cases treated with I.P.P.R. only 5 were poliomyelitis, and even this figure was artificially inflated, for 2 of the 5 patients were brought from overseas. There were 4 cases of acute toxic polyneuritis; 3 of these recovered completely and 1, still under treatment, was gradually improving. Although these patients may at their worst have complete paralysis of almost all voluntary muscles, the expectation that they will eventually recover fully makes it all the more important to get them over the acute stage. Other cases treated with I.P.P.R. included one of severe tetanus[6] in which recovery was complete, and one of barbiturate poisoning which proved fatal.

The value of I.P.P.R. is now established and every hospital should know where this treatment is available. Long-term treatment makes heavy demands on medical, nursing, and ancillary staff, all of whom must be experienced. For this reason units that are prepared to treat these cases must be situated in a large hospital and, since a variety of diseases may call for I.P.P.R., this will usually be a general hospital. It is perfectly safe to transport these patients under skilled supervision, preferably by an anæsthetist, and all respiration units should be ready to send a team to fetch their patients.

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Special Articles

ERADICATION OF LEPROSY IN BRITISH TERRITORIES

RÔLE OF REPEATED SURVEYS OF CONTACTS

Sir LEONARD ROGERS

K.C.S.I., C.I.E., M.D. Lond., LL.D., F.R.C.P., F.R.C.S., F.R.S.

DURING forty years' researches on leprosy, I established in 1915–17 the first effective treatment of the disease, in early cases especially, by injections of sodium hydnocarpate. This caused great destruction of lepra bacilli in infectious mucocutaneous cases—now designated by the less descriptive term "lepromatous."

In 1921–23 I studied the literature of the previous fifty years in order to find out how to discover the numerous early amenable cases. Under the centuries-old type of compulsory segregation these early cases were overlooked or hidden until too advanced to be rapidly cleared up by the hydnocarpate treatment. The old segregation system had therefore become worse than useless; it was actually harmful. I was thus led to formulate a new system for controlling the disease.

A Plan for Reduction and Eventual Eradication

The failure of segregation—as practised for a century in South Africa and intensively for forty-four years in the Philippine Islands—was due, in the absence of any effective treatment, to delay in discovering and segregating the cases. The average duration of the symptoms before the patients were segregated was seven to nine years. During this time they infected numbers of their households and other close contacts, most of whom developed their first symptoms within the next five to ten years and thus brought about a recrudescence of the disease; and so on indefinitely.

My epidemiological studies had also shown that 95% of new infections were derived from close (usually house) contact with mucocutaneous cases in which each day myriads of lepra bacilli were discharged from the nasal cavities. I concluded that only this highly infectious type, constituting but one-fifth of the total cases, are in urgent need of isolation. Moreover, I noted that a large proportion of new cases arise in children and adolescents who have usually lived for years with earlier cases; and this makes it necessary to examine all house and other contacts every year or two *after* the infective case has been removed from among them, so as to detect early symptoms and treat the disease before it reaches an infective stage. My advice therefore was:

(1) Only the 20% patients who are highly infective need to be segregated—with proportionate decrease in the heavy cost of the policy of segregation. When an effective remedy is offered, patients will accept segregation for the sake of treatment.

(2) After segregation of the infective cases all the people in close contact with them should be repeatedly surveyed to detect early symptoms. Early cases can have outpatient treatment economically at the hospitals and at special clinics; the development of "indeterminate" cases into a highly infective stage can thus be prevented, and the plague can be stayed.

This plan was first followed in a rapidly spreading outbreak of leprosy in the small South Pacific island of Nauru. The prevalence was reduced in three years by 40% (Bray 1930) and in eight years by two-thirds (Grant 1934)—an unprecedented success.

In a large-scale trial in South-East Nigeria Kinear Brown and Davey (1942), using hydnocarpate, obtained in seven years a 45% decline of the very high prevalence of 113 per 1000. The work was then taken over by the Nigerian Government and greatly extended with the aid of the simple oral sulphone treatment.

Austin (1935) has reported good results in Fiji, where the cases were scattered over 322 islands, and therefore had to be concentrated in a central leprosarium. He has recently been able to allot one-third of his accommodation to patients from islands outside the Fiji group.

In South Africa the medical authorities found one-third of their 2501 segregated cases to be negative bacteriologically. The release of these patients and the adoption of modern control measures led to many voluntary admissions of early cases, and resulted, during the fifteen years up to 1938, in the discharge as uninfective of 4502, or 66% of the greatly increased number of known cases (Rogers and Muir 1946). By 1953, with the sulphone treatment, 12,000 cases had been so discharged and the prevalence of the disease had fallen to approximately one-third of the rate before modern methods were used (Davidson 1953).

The practicability of controlling leprosy by these measures has thus been demonstrated. Their applicability throughout British territories and with modifications to meet special conditions, remains to be considered.

Cases per Square Mile

With the aid of data accumulated for table I of *Leprosy* (Rogers and Muir 1925–46) I have worked out the accompanying table of leprosy prevalence, populations, and leprosy cases per 100 sq. miles.

The table as a whole shows 750,000 cases in British Dominions, spread over 2,500,000 sq. miles. This reveals a formidable task in applying control measures.

Part I shows the more accurate leprosy data in the surveyed areas of West and East Africa. Those of the unsurveyed territories (parts II–IV) are based for the most part on estimates made by successive medical secretaries of the British Empire Leprosy Relief Association (BELRA) during repeated tours since it commenced work in 1924. The latter figures are probably still below the true numbers, but they are the most reliable available.

Those of surveyed British African territories amount to 645,000, or 86% of the total; with the inclusion of those of unsurveyed areas, the African figure rises to 98% of those in British administered territories, for whose welfare Great Britain is responsible. Moreover, in the African surveyed areas 153,000 cases are classed as highly infective, requiring isolation at great expense, together with repeated surveys of their contacts.

The chief object of this article is to point to the wide variation in leprosy prevalence per sq. mile and to suggest possible modifications of the full modern control measures in relation to local conditions.

The Territories Reviewed

I. Surveyed Areas of West and East Africa

Nigeria shows a total of 400,000 cases, or 20 per 1000 population, and 108 per 100 sq. miles. The infective cases are estimated at 100,000. The success of the control measures in the south-east, already mentioned, together with the establishment of the efficacy of sulphone treatment with dapsone orally by Lowe (1951), led the Nigerian government, with continued help from BELRA, to extend the control measures throughout Nigeria. At the end of 1953 58,000 cases, or 14·5% of the total, were under treatment—the largest proportion in any extensive British territory. Still more important, 29·5% of infective cases were isolated in 302 special villages, with a corresponding reduction in newly arising cases, mostly in children.

This left control in *East African* territories (245,000 cases, 53,000 infective requiring isolation) as the most important remaining task. I have elsewhere dealt with the gradual progress of control measures in East Africa (Rogers 1954). The sample surveys of Ross Innes furnished the data in the table of five territories. At the

PREVALENCE OF LEPROSY IN BRITISH TERRITORIES

Territories	Population	Sq. miles	Population per sq. mile	Cases	Cases per 1000 population	Cases per 100 sq. miles
Part I—In Surveyed Areas of Tropical Africa						
Nigeria	25,000,000	372,634	66	400,000	20·00	108
Uganda	4,955,176	93,981	53	80,000	17·80	82
Kenya	5,184,423	224,968	23	35,000	10·20	15
Tanganyika	7,074,168	362,688	19	80,000	22·00	22
Nyasaland	2,049,450	47,950	43	30,000	14·30	62
Northern Rhodesia	1,656,899	290,323	6	20,000	12·20	7
Totals	45,920,116	1,372,584	..	654,000	..	..
Part II—In High-prevalence Areas of Unsurveyed Territories						
Zanzibar and Peruba	7402	540	280	1311	4·96	242
Mauritius	266,000	805	592	2250	8·38	280
Straits Settlements	1,000,000	217	4613	1200	1·20	530
Hong-Kong	2,317,000	391	5941	38,400	18·57	9846
West Indies	2,596,000	7580	342	2700	1·00	281
Part III—In Moderate-prevalence of Unsurveyed Territories						
Gold Coast	4,111,680	91,130	23	20,000	9·10	22
Sierra Leone	1,838,000	28,000	66	18,000	12·10	65
Southern Rhodesia	1,028,000	150,300	13	6500	5·36	43
Federated Malay States	4,080,000	50,000	82	3127	0·60	62
Fiji Islands	285,000	7100	40	2773	13·90	39
British Guiana	414,000	83,000	5	1172	2·80	47
Part IV—In Low-prevalence Areas of Unsurveyed Areas						
Somaliland	600,000	68,000	8	200	0·33	0·3
Union of South Africa	1,418,000	473,000	24	5195	0·77	1
South African Protectorates	1,042,000	293,488	3	1205	1·20	2
British North Borneo	360,000	30,000	10	500	1·40	2
Solomon Islands	95,000	11,500	8	900	9·57	8
Grand totals	67,378,198	2,587,635	..	750,433	..	..

end of 1953 the percentage of cases under treatment was 10·7 in Tanganyika, 8·6 in Uganda, 8·5 in Northern Rhodesia and 4·5 in Nyasaland; in the last it was being extended rapidly, thanks to a legacy of nearly £250,000 from an enlightened European resident.

Three leprosaria are being constructed, with a research laboratory at one of them; but provision has yet to be made for the great majority of the infective cases. It will probably be necessary to provide many model villages for their isolation, so it is fortunate that Dr. Kinear Brown has already commenced their construction in Uganda, where he is now leprologist.

The new data of populations per sq. mile in column 3 of the table, and of leprosy per 100 sq. miles in column 6, are of great importance in connection with surveys of contacts to detect early cases; for in East Africa the rates per sq. mile are both below those of Nigeria and vary widely among themselves. Thus the cases per 100 sq. miles, are 108 in Nigeria but only 22, 15, and 7 respectively in Tanganyika, Kenya, and Northern Rhodesia in which the populations per sq. mile are also very low. When dwellings are widely scattered and communications are poor, there is likely to be less spread of leprosy among the neighbours of people with the disease.

For the detection of a large proportion of newly developing cases it may prove sufficient, under such conditions, to limit the biennial surveys to houses of known leprosy patients and those of relations and intimate friends with whom they come into most close contact.

It is to be hoped that similar epidemiological surveys may be carried out in areas around the new leprosaria under construction in East Africa to ascertain if this suggestion is of practical value.

The task of controlling leprosy in the vast infected East African territories is so immense that adoption of the full control measures is likely to be limited, for some time, to the towns and more densely inhabited areas. Any success will lead to their wide extension, as has already happened in Nigeria. As more and more of the leprosy patients attend hospitals and clinics in order to obtain the effective oral dapsone treatment, the medical authorities are better able to recognise the areas of high prevalence most suitable for applying methods of control that will eventually eradicate the disease.

II. Unsurveyed Territories with High Prevalence per 100 sq. miles

These are all comparatively small, overcrowded islands where hot humid climates favour the disease. The prevalence of leprosy ranges from 242 per 100 sq. miles to no less than 9846 in Hong-Kong to which leprosy cases flock in from Chinese territory to obtain treatment.

Under these conditions all the indigenous people are exposed to infection, although new cases are most likely to arise in houses with earlier ones. They are just the areas in which isolation of the infective lepromatous cases, combined with two-yearly examinations of all the people for newly developing ones, are essential if the incidence of leprosy is to be rapidly reduced. Only repeated surveys of all the people, with immediate treatment of the early and indeterminate cases which might otherwise soon become infective, can prevent recrudescences of the disease; but in the long run measures of this kind will prove to be a great economy. These islands are pre-eminently suited to the application of the complete system of control that I have been persistently advocating during the past three decades.

III. Unsurveyed Territories with Moderate Prevalence per 100 sq. miles

Here the populations per sq. mile and the leprosy-rates per 100 sq. miles can be reckoned in tens—against hundreds in the areas of part II and unities in those of part IV. In other respects they show greater variation in the local conditions.

The *Gold Coast* and *Sierra Leone* are the most important, with estimates of 20,000 and 18,000 cases respectively. These estimates give rates per 1000 so much below those of Nigeria, with its very similar climatic conditions, that they are probably underestimates.

Southern Rhodesia has a better climate and a lower leprosy-rate per 1000. The medical authorities do not consider it necessary to carry out surveys of sample

areas and they rely on treatment of cases at hospitals and dispensaries.

The *Federated Malay States* have a hot humid climate similar to the adjacent high-incidence area of the overcrowded Straits Settlements. In the former there is much jungle with few inhabitants; so it should suffice to confine full control measures to those areas in which most cases are found.

British Guiana presents somewhat similar conditions, for a large part of the inhabitants are concentrated near the 500 miles of coastline. Much of the 83,000 sq. miles, extending far inland to the northern boundary of Brazil, is inhabited by a few thousand aboriginal Indians, whose isolation prevents the spread of leprosy. Hence full control measures seem to be needed only in the coastal zone, where a good deal has been done in the past three decades; for this was the first British territory to modify its compulsory segregation law to permit uninfective cases to be treated as hospital outpatients.

Fiji.—Good results of the application of control methods in these islands have already been mentioned.

IV. Unsurveyed Territories with Low Prevalence per 100 sq. miles

In four of these territories the population per sq. mile is not above 10 and in the fifth it is 24; the leprosy-rates per 100 sq. miles are from 0·3 to 8 only. *Somaliland, South Africa,* and the *South African Protectorates* have low humidities unfavourable to leprosy, and repeated examination of the whole populations is both impracticable and unnecessary. On the other hand, repeated examination of known contacts is advisable, and, as already remarked, has proved its value in the successful control methods in use throughout the Union of South Africa during the past three decades.

North Borneo and the *Solomon Islands* have hot humid climates but sparse populations (8 to 10 per sq. mile). Here again only examination of contacts of known cases is likely to be required.

Summary and Conclusions

The discovery in 1915–17 of an effective treatment of fairly early cases of leprosy rendered the centuries-old compulsory segregation of all discovered cases harmful as well as futile. Under the segregation policy cases were hidden during the early years when they were amenable to hydnocarpates.

During 1921–23 a study of former records showed that 95% of new infections arise through close contact with advanced mucocutaneous (lepromatous) cases. After such infection the disease may not be manifest for five or ten years, but some cases soon become infective. Children and adolescents are especially susceptible.

I therefore advised that only the highly infective cases, constituting only some 20% of leprosy patients, should be isolated in leprosaria and special villages. The population of the controlled areas should then be surveyed every two years or so for a decade; and all newly developing cases, as well as other uninfective ones, should have outpatient treatment at hospitals and special clinics.

By the intensive use of these measures unprecedentedly rapid reductions of leprosy prevalence were obtained in the South Pacific island of Nauru, in a high-incidence province of South-East Nigeria, in South Africa, and in the Fiji Islands.

The varying prevalence of leprosy per 100 sq. miles has been studied and possible modifications of the control measures to suit local conditions have been considered.

In the surveyed areas of West and East Africa which include 645,000 cases or 86% of those in British territories, control measures are being rapidly extended.

The highest prevalence-rates are in overcrowded islands, with several hundred cases of leprosy per 100 sq. miles. In these, full control measures are essential.

In areas with the moderate incidence of 22–65 cases per 100 sq. miles, it is probably impracticable to do more than carry out repeated surveys of the house and other close contacts of known cases. This should enable a large proportion of new cases to be found and treated early.

In areas with only 1–8 cases per 100 sq. miles, surveys of contacts of known cases should certainly suffice.

It is estimated that there are still about 750,000 leprosy cases among 68 million people spread over 2½ million sq. miles of British-administered territories. Especially now that the more effective sulphone treatment is available, it is possible to envisage the steady reduction, and eventual eradication, of the disease—given the necessary staff and funds.

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TWO ASPECTS OF TUBERCULOSIS

THE annual conference of the British Tuberculosis Association, held in Cambridge from June 28 to July 1, under the presidency of Dr. F. A. H. SIMMONDS, included discussions on Migration and Tuberculosis and on Major Thoracic Surgery.

Migration and Tuberculosis

Dr. NORMAN MACDONALD (Clare Hall) discussed pulmonary tuberculosis in patients born overseas. Of 258 such patients in hospitals in the London area and the Home Counties, about half were of European origin, a third were coloured, and the remaining sixth came from Malta or Cyprus; these two islands contributed more than all the countries of Southern and Western Europe. Males outnumbered females 2 : 1. Three-quarters of the patients were over 25 years of age; only 12 were under 20. The group from North, Mid, and East Europe was the oldest, many being refugees. Apart from students, most patients had come to find work, and only 6 specifically for treatment. The majority were resident in central London, especially the sector north and west of Charing Cross. Few coloured patients came from the East End or from south of the Thames.

Of 21 patients with active disease on arrival, 16 were admitted to hospital within three months and only 1, an Indian, after more than six months. Excepting North Europeans, most were diagnosed in the early years after arrival.

Early acute lesions predominated in Cypriots, Africans, and West Indians; in Europeans the lesions were more often of the later or recrudescent type. Indians showed an even proportion of both types. The early type of lesion was twice as common in patients of rural origin. Stress factors were commonly elicited in all groups; much the commonest factor was over-work, particularly over-time. Next came mental strain due to difficulties in adjustment, homesickness, and anxiety. Stress was particularly evident during the period immediately after arrival; change of climate and food, and especially of the pace of life, created difficulty.

In the north-west Metropolitan region a survey showed that an average ward of 15 patients contained 12 British, 2 Irish, and 1 patient born overseas. That the Irish accounted for twice as many beds occupied as all the overseas contingent was explained by their number (20,000 arriving per annum), their youth (majority under

25), the predominance of females, and the large proportion of rural stock. West Indians (recently arriving at the rate of about 10,000 per annum) had so far produced relatively few cases because many had been here only a short time, they were older (70% over 25), and there were fewer females; but the type of lesion found gave rise to some concern. Immigrants from Europe were not now a large problem. Many regions scarcely had an immigrant problem.

To deal with the situation the country of origin could undertake routine radiography and tuberculin testing of intending migrants, with B.C.G. vaccination of negative reactors; but this would give rise to difficulties if imposed as a requirement for entry to this country. The congregation of migrants in particular areas and in certain trades (catering, clothing, and building) suggested how mass diagnostic facilities might be concentrated. The matter should be tackled as an epidemiological problem, and the medical profession should prepare a workable scheme. There remained the difficult problem of overcrowding, and legislation might be considered for compulsory radiography and tuberculin testing of those engaged in handling food and drink.

Dr. MICHAEL FLYNN (co. West Meath), discussing the Irish aspects, described how the flow of emigrants rose rapidly after the famine of 1847, till by 1901 the population had been reduced by half. Since then the rate had fallen, but between 1901 and 1926 the number averaged 26,000 per annum, the majority going to the United States; from 1931 onwards Britain became the major receiving country, and since the war young females had predominated. The greatest exodus to Britain was from the western counties—the least urbanised areas, where rates of tuberculin-positivity were low.

Of 1165 patients in Dublin sanatoria 202 (17%) came from outside co. Dublin, but 21% of the general population were born outside this area. The position was different, therefore, from that in London. It could be explained by many patients of rural origin returning home for treatment, by tuberculosis morbidity being considerably higher than that in London, and by the majority of migrants to Dublin coming from the adjacent Leinster counties where tuberculin-positivity was more prevalent than in the West; furthermore a higher proportion were students, professional people, or skilled workers.

10% of patients on the Irish register had developed tuberculosis in Britain and returned home, often infecting other members of their families; others broke down some time after return, constituting a considerable epidemiological problem. In 1951–53 in co. Roscommon, of 121 new cases in the 15–34 age-group 60% had resided in areas outside the county—31% in Britain. Both internal and external migration were therefore important, and the returned migrant was also a source of possible danger.

Dr. J. CYRIL JOYCE (co. Roscommon) urged the adoption of a preventive approach. While housing, nutrition, and working conditions were not matters over which doctors exerted direct control they should emphasise the importance of these and make recommendations to the authorities. Certain medical and public-health measures could be put into effect without undue delay. B.C.G. vaccination of negative reactors amongst the young adult population should be undertaken, if possible, before the migrant left home. Difficulty in getting the selected groups to attend clinics should be overcome as far as possible by propaganda in the press, radio, and cinema; but such propaganda might not have sufficient effect on the people chiefly concerned. A better method would be to seek the coöperation of employers and trade unions in Ireland in making a tuberculin test and radiographic examination a part of pre-employment medical examination.

Emigrants to the U.S.A. were required to have a radiographic examination but not a tuberculin test. Tuberculin-negative susceptibles were therefore often accepted, while others with healing primary lesions who were less of an epidemiological risk were rejected. American thought on this matter required reorientation.

Routine B.C.G. vaccination of school-leavers in emigrant areas in Ireland was being undertaken, but its effectiveness might not persist at 15–25 years of age. People of urban origin, particularly natives of Dublin where the tuberculin-positivity rate was high, should be examined radiographically before leaving home.

Uncontrolled emigration to Britain was a difficult problem, but a concentrated effort in cities to which immigrants were attracted should yield results. The appointment of a social worker, preferably Irish, who could contact migrants in their places of employment and recreation would help. People entering certain occupations should have a tuberculin test as a routine feature of the pre-employment medical examination.

The changing tuberculin state of the populations of both Britain and Ireland necessitated periodic review of the position. Tuberculin testing should be accorded its rightful place in the epidemiological control of tuberculosis; large-scale tuberculin surveys should become routine in all areas, and would help both countries to formulate a definitely preventive approach to the problem of migration and tuberculosis.

In the discussion Dr. JAMES DEENY (Dublin) pointed out that active recruitment, often of skilled workers, was a feature of present-day emigration from Ireland. Dr. EDWIN JAMES (Dungannon) suggested that the tuberculin-positive migrant was the chief source of danger. Dr. W. HARTSTON (London) expressed doubt as to whether migration constituted much of a problem. Dr. MACDONALD and Dr. FLYNN, replying, emphasised the vulnerable position of the tuberculin-negative migrant.

Major Thoracic Surgery

Dr. L. E. HOUGHTON (Harefield) described preliminary findings in a national survey of major thoracic surgery for pulmonary tuberculosis, conducted jointly by the British Tuberculosis Association and the Society of Thoracic Surgeons. Seventy-five surgeons throughout England and Wales contributed information on all their patients who had a major operation for pulmonary tuberculosis between April 1, 1953, and March 31, 1954. In all, 8500 cases were admitted to the survey.

Cases were classified according to type of disease; other information included the period from first diagnosis, the state of the contralateral lung, details of previous treatment, and preoperative sputum state. These data were collected from the various hospitals; and follow-up was conducted through the hospitals and chest clinics. The administrative work was carried out at Harefield Hospital.

It was, said Dr. Houghton, too early to draw definite conclusions, but he gave a personal assessment based on 5584 cases. Only 47% of the cases of extrapleural pneumothorax had perfect results, compared with 52% of those treated by pneumonectomy, 79% of segmental resections, and 65% of thoracoplasties.

One problem was the procedure to advise for the treatment of persistent unilateral apical lesions. 1511 cases of this type were considered, and the mortality of those treated by thoracoplasty and resection was compared. The mortality after resection was three times that after thoracoplasty.

Mr. B. BENJAMIN (statistical adviser) presented an official preliminary report based on 3183 cases operated on in the five months April to August, 1953. It was not a clinical trial with random allocation of cases to different forms of treatment, but a large survey with wide distribution of material.

At the end of the first year, only 0·7% of cases were lost sight of. In 12% of the whole series no positive sputum had ever been recorded at any time.

Very roughly it could be said that the majority of patients had chronic cavitated disease in one or more lobes, and that in many the other lung was involved. In more than half the cases there was a history of over two years since first diagnosis, and during this time many had had collapse therapy or other surgical treatment. The sex and age distribution was typical of the tuberculous population excluding the elderly. 84% were given chemotherapy, lasting six weeks or more, preoperatively.

Bronchopleural fistula was the most serious complication. This was recorded in 141 patients (4%), of whom 17 died within a year. The incidence was highest in the segmentectomies, although most of the deaths occurred in the lobectomy groups.

At the end of the first year 91% of the survivors were radiographically satisfactory, and 7% had positive sputum. Two-thirds of the latter were in the thoracoplasty group. In the resection groups only 5% had a positive sputum recorded more than six months after operation, compared with 23% in the thoracoplasties. The total tuberculous mortality was 3% (96 cases). About two-thirds of the deaths occurred in the first month. The mortality for pneumonectomy was 9·2%, for thoracoplasty 2%, and for segmentectomy 1·3%. Mortality increased with age and with extent of disease; it was much greater in cases with persistent chronic cavitation. Almost half the deaths occurred in cases with a positive sputum recorded a month before operation—a group numbering 23% of the whole.

Sir CLEMENT PRICE THOMAS said that, as regards morbidity and mortality, it was cavitated disease that counted. Thoracoplasty had the lowest mortality excluding segmental resections; in cases submitted to the latter operation there was a minimal amount of disease. Fewer of the segmentectomies (50%) had cavities, compared with thoracoplasties (88·9%). Lobectomy had twice the mortality of thoracoplasty. He believed that the high incidence of bronchopleural fistula in segmentectomies was due to the recording of air-leaks, as the mortality in segmentectomy was small compared with that in lobectomy. Contralateral spread occurred in 2·9% of thoracoplasties and in 2·4% of lobectomies. This worsened the prognosis, for the patient with bilateral disease was known to fare badly. Persistent cavitation after thoracoplasty was found in only 5·3%. This was a great advance on the position ten years ago. The decrease in early mortality was due to preoperative chemotherapy. In his own series those who died had persistent cavitation. Every effort should be made to convert the sputum and close the cavities before operation. Chemotherapy should be continued for at least six months after operation, or longer if residual disease were present.

Mr. T. HOLMES SELLORS was unable to be present, and his paper was read by Mr. L. D. Abrams, of Harefield Hospital. When his patients waited eighteen months for surgery, 15% did not need operation when their turn came. The personal element in the selection of cases was important. Mr. Holmes Sellors thought that a control series was necessary but that a statistical evaluation of such a series would not be possible.

Three-quarters of the patients were fit or working at the end of twelve months; a third were doing full-time work. This was a quicker return to work than he would have thought possible. In men resection predominated up to 25 years of age, whereas in women it was commoner than thoracoplasty up to 35. There must be cases where the same type of disease was treated differently in men and women, for cosmetic reasons; this might later enable the two methods to be compared. He was surprised that lobectomy had a mortality twice that of thoracoplasty, and greater than that of lobectomy for bronchiectasis.

Mr. HUGH REID (Liverpool) presented figures for operations performed in North Wales in recent years. Ten years ago patients had long histories, and the problem was one of sclerosis and cavitation. Patients now came with negative or no sputum. Physicians often asked surgeons to remove small foci, and that was partly why fewer thoracoplasties were performed.

Dr. A. K. GOLEBIOWSKI reported results at Preston Hall from 1949 to 1953; all cases were reviewed this year. The postoperative mortality had greatly decreased since 1949–50, probably owing to increased preoperative chemotherapy.

VOLUME OF BODY-FLUIDS

AT a meeting of the Renal Association in London on June 30 Dr. Alexander Leaf (Massachusetts General Hospital, Boston, and department of biochemistry, Oxford University) and Dr. Oliver Wrong (Manchester Royal Infirmary) opened a discussion on Control of the Volume of the Body-fluids.

Dr. LEAF said that the constancy of body-weight attests to the precision with which the quantity of its main constituent, water, is maintained. The volume of intracellular fluid depends on the function of each individual cell, whose volume is the result of a balance between intracellular oncotic pressure, tending to cause swelling, and active extrusion of sodium, tending to cause shrinkage. As the number of cells in the organism remains constant, so does the volume of intracellular fluid. The volume of extracellular fluid (E.C.F.), however, must depend on some integrated regulating mechanism which operates through an as yet undiscovered receptor pathway. Dr. Leaf described two physiological states in which evidence of fluid-volume regulation is apparent, and in which such regulation further aggravates an existing disturbance in body-fluid concentration. The first is that of too little sodium in the body. Deficiency of the major extracellular cation results in a reduction of E.C.F. volume, which is minimised by retention of water and dilution of the body-fluids. This disturbance has been produced experimentally in dogs and man and is also seen in clinical salt depletion and in the relative sodium deficiency which may complicate congestive heart-failure and cirrhosis. The second condition is that of too much water in the body. Excess of pure water results in overexpansion of body-fluid volume which the body attempts to rectify by a large excretion of sodium. This condition was produced experimentally by preventing with 'Pitressin' the excretion of a large water load. Its clinical counterpart is seen in water intoxication. These observations leave little doubt that there exists some mechanism which jealously protects the constancy of E.C.F. volume even, if need be, at the expense of the concentration of body-fluids.

Dr. WRONG gave an account of further investigation of the sodium diuresis of pitressin-induced water retention. When overhydration is produced rapidly by the intravenous route there is a delay of six to ten hours before maximal sodium diuresis. By contrast, expansion of E.C.F. by physiological saline results in an immediate sodium diuresis which persists for up to forty-eight hours. Dr. Wrong postulated that differences in glomerular filtration of sodium explain these findings. Following water retention, plasma-sodium falls and filtered sodium is not increased; after a significant delay sodium diuresis results from the activity of nervous or humoral mechanisms responding to increase in E.C.F. volume. The immediate sodium diuresis after intravenous saline is probably the result of an increase in filtered sodium; homœostatic mechanisms reducing tubular reabsorption contribute to the prolonged sodium diuresis. Increased bicarbonate excretion was constantly observed to accompany the sodium and chloride diuresis of pitressin-induced overhydration. Thus expansion of E.C.F. promotes renal loss of its three main ionic con-

stituents. A similar loss of bicarbonate has been observed during diuresis induced by corticotrophin in nephrotic patients.

In the discussion, Dr. W. J. O'CONNOR described experiments in the dog in which he had estimated sodium excretion when the concentration of plasma-proteins was altered by infusions or when the blood-pressure was altered by occlusion of the carotid arteries or during infusions of adrenaline. In every case changes in sodium excretion followed the expected changes in glomerular filtration-rate (G.F.R.). He thought that the increased excretion of sodium in the experiments described by the speakers could be explained by small increases in G.F.R. Sodium excretion might be doubled by increases of G.F.R. of the order of 5%, and the curve of the relationship between these two variables might be shifted by administration of corticotrophin, so that increased sodium excretion would not be seen until a higher G.F.R. was reached, but after that a further increase of 5% would again double the excretion. He thought that the actual G.F.R. was more important in determining the rate of sodium excretion than the filtered load, for the former might increase with the G.F.R. when the plasma-sodium concentration fell.

Dr. LEAF admitted that it was very difficult to distinguish between the rôles of the glomeruli and of the tubules in determining the changes in sodium excretion which he had described, but he thought that there was definite evidence that changes in tubular function were at least partly responsible, and that in regulating sodium concentration in the urine it must be the tubules that had the last word.

Dr. M. D. MILNE noted that in Dr. Wrong's experiments an increase in bicarbonate excretion was less than that of sodium, and wondered what other anion could be excreted in greater quantity. Dr. WRONG thought that this difference was probably accounted for by decreased excretion of ammonium.

Dr. OLIVER GARROD said that in the dog deoxycortone acetate prevented an increase of sodium excretion following a rise in G.F.R. Dr. A. A. G. LEWIS thought that man and dog handled sodium loads differently. It was easier to change the G.F.R. in the dog; this might explain why dogs could excrete large sodium loads so rapidly. In man tubular influences might predominate. He pointed out that the speakers had described changes in sodium output with changes in E.C.F. volume, but that the latter could also produce changes in water output by affecting the secretion of antidiuretic hormone. Dr. Wilkins and his group in Boston had found that the application of congesting cuffs to the thighs invariably provoked antidiuresis when the subjects were not water-loaded. He himself, working with Dr. T. M. Chalmers and Mr. G. L. S. Pawan, had repeated these experiments on hydrated subjects, and antidiuresis had not occurred. It seemed probable that the control of volume was in this case secondary to that of tonicity; when secretion of antidiuretic hormone was completely suppressed by a water load a reduction of volume was no longer effective in stimulating it.

Mr. G. J. SOPHIAN said that large doses of corticotrophin had been found to have no effect on sodium and water excretion in pregnant women, and thought that tubular function must be modified by pregnancy.

Dr. H. E. DE WARDENER noted that the urine might become hypertonic to the plasma when the G.F.R. was sharply reduced. This change might occur within twelve minutes of reducing the G.F.R. and might be reversed three and a half minutes after increasing it, so it could hardly be due to the production of antidiuretic hormone. Dr. LEAF thought that renal ischæmia might be partly responsible, but agreed that this influence might be expected to lead to isosthenuria and would probably not be so short-lived.

HOSPITAL BUILDING PROGRAMME

ON Feb. 9 the Minister of Health announced the Government's plan to speed hospital building.[1] In the House of Commons on July 1, he gave details of the programme for 1955–58.

WORK IN HAND

On the following 10 large schemes work has already begun or will be started during 1955–56:

Regional Hospital Boards	
Newcastle	Newcastle General Hospital—pathological institute and regional blood-transfusion centre
Sheffield	Balderton Mental Deficiency Hospital—development scheme (phase I)
North West Metropolitan	New hospital at Welwyn (phase I)
South East Metropolitan	Lewisham Hospital—new outpatient department
South West	Horton Hospital Estate—centralisation of boilers
Birmingham	Coventry and Warwickshire Hospital—development scheme (phase III)
Liverpool	New mental-deficiency hospital Greaves Hall (phase I)
Boards of Governors	
United Bristol Hospitals	Royal Infirmary—joint university heating scheme
United Oxford Hospitals	Radcliffe Infirmary—development scheme
St. Thomas's Hospital	St. Thomas's Hospital—reconstruction

PROBABLE STARTERS

For the programme for 1956–57 and 1957–58 the Minister has selected 35 schemes as probable starters. To encourage speedy action by the boards he has included projects to a total value of more than the £17½ million fixed as the ceiling for these years. In general the projects which are ready soonest will be started first. But any of these schemes which are not started by the end of 1957–58 will have first claim on the resources of 1958–59. The selected schemes and the year in which they are scheduled to start are given below:

Regional Hospital Boards		
Newcastle	New hospital for West Cumberland	1956–57
	Prudhoe and Monkton Mental Deficiency Hospital development scheme (phase I)	1956–57
	(phase II)	1957–58
	Middlesbrough General Hospital accident and orthopædic department	1956–57
Leeds	New hospital at Huddersfield (phase I)	1957–58
Sheffield	Scunthorpe and District War Memorial Hospital development scheme	1956–57
	Aston Hall Hospital extensions	1957–58
	Doncaster Royal Infirmary development scheme	1957–58
East Anglia	St. Luke's Hospital, Lowestoft, reconditioning scheme	1956–57
	Peterborough and District Memorial Hospital—extensions	1957–58
North East Metropolitan	North Middlesex Hospital—new outpatient department	1956–57
	South Ockendon Hospital—extensions	1956–57
	New hospital for Harlow (phase I)	1957–58
South West Metropolitan	St. James' Hospital, Balham—development scheme (phase II)	1956–57
	New hospital for Crawley (phase I)	1956–57
Oxford	New hospital for Swindon (phase I)	1956–57
South Western	Southmead General and Stapleton hospitals—geriatric accommodation	1956–57
	Digby Hospital—additional accommodation for mental patients	1956–57
	New hospital at Truro	1957–58
Wales	West Wales Hospital, Glangwili—development scheme (phase I)	1956–57
	Caernarvon and Anglesey Hospital, Bangor—development scheme	1956–57
	New hospital at Swansea (phase I)	1957–58
	Llanfrechfa Grange Mental Deficiency Hospital—extensions	1957–58
Birmingham	New mental hospital at Scisdon (phase I)	1957–58
	New hospital at Coventry	1957–58
Manchester	Cranage Hall Hospital—additional accommodation for mental defectives	1956–57
	New hospital at Wythenshawe (phase I)	1957–58
Liverpool	Newchurch Mental Deficiency Hospital—extensions	1956–57

1. See *Lancet*, 1955, i, 410.

Boards of Governors		
United Newcastle Hospitals	Royal Victoria Infirmary—new outpatient department	1957–58
United Leeds Hospitals	General Infirmary—extension to outpatient department	1956–57
United Sheffield Hospitals	New teaching hospital, Glossop Road (phase I, outpatient department)	1956–57
United Cambridge Hospitals	Addenbrooke's Hospital—development scheme (phase I)	1957–58
United Manchester Hospitals	Royal Infirmary—reconstruction scheme	1956–57
University College Hospital	New dental hospital—Mortimer Market, W.1	1956–57
Charing Cross Hospital	New hospital at Northwick Park	1957–58
Guy's Hospital	Guy's Hospital surgical ward block	1957–58

The immediate programme thus includes 14 new hospitals, including 9 new general hospitals. Work on some of the schemes may be spread over ten years. It is expected that they will provide about 6000 more hospital beds, half in general hospitals and half in mental and mental-deficiency hospitals. During 1956–58 the boards will also have available £19 million for normal capital expenditure.

A further £6 million has been set aside for plant replacement during 1956–58. It is to be allocated among the boards according to the number of their beds.

WORK OF THE KING'S FUND

The Duke of GLOUCESTER, presiding at the annual meeting of King Edward's Hospital Fund for London on June 27, referred to a special report about mental hospitals, recommending an allocation of £250,000 to be spread over three years and including three grants on a larger scale than usual.

"As the report points out, the factors which stand out most prominently today are, first, the legacy of old and often gloomy buildings inherited from the past which confront us on every hand. . . . Even if the Government and the regional authorities can increase the priority accorded to the mental hospitals, new needs and higher standards will quickly absorb whatever may become available. Against such a background the possibility of some help from outside sources, such as leagues of hospital friends, or from a body like the King's Fund, provides a stimulus and encouragement out of all proportion to the actual amount given. There is still an immense field for voluntary help. The second prominent factor is the change taking place in the whole attitude towards the mentally ill and in their treatment . . . here and there pioneer work has been undertaken to provide, within the existing framework of the hospital, a more normal way of life and a much more cheerful environment for the patients. The report recommends that the Fund should sponsor three of the major schemes now being planned, and also continue grants of the kind which they have been making for the last few years."

Lord ASHBURTON, treasurer, said that income for the year apart from special receipts amounted to £337,717, and there had been a modest increase in subscriptions and donations. Legacies had amounted to £24,253. This was less than usual, but the current year showed signs of improvement. Expenditure for the year had amounted to £331,476.

Mr. MALCOLM MCCORQUODALE, seconding the adoption of the report of the subcommittee on mental and mental-deficiency hospitals, said that in the past five years the Fund had spent £136,000 on such hospitals. Of this, £30,000 had been spent on helping to improve the catering service. This was regarded as so important that it was proposed to earmark £50,000 of the new allocation for the same object. About £100,000 would be earmarked for grants for general amenities, as it was said on all sides that these grants gave encouragement and help far beyond their intrinsic value. Finally, the subcommittee had been left in no doubt that for patients who had been successfully treated there was a great need for means of rehabilitation to help them to adjust to the demands of everyday life. It was proposed, therefore, to earmark the remaining £100,000 of the new allocation for pioneer schemes with this object. One was for an occupation centre, one for a social centre, both within hospitals, and one for a community centre for outpatients. All aimed at providing purposeful activities for the patients and helping them to return to ordinary social relationships.

Public Health

THE ISOLATION OF BACILLUS ANTHRACIS FROM BONES

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IN an earlier paper (Davies and Harvey 1953) we described 14 cases of anthrax among workers in a chemical factory. The raw material responsible was sun-dried bones from the Near and Middle East.

There is little information about the frequency with which *Bacillus anthracis* can be isolated from bones and bone products. Glynn and Lewis (1912) isolated the organism from 1 out of 4 samples of bones supposed to have produced anthrax in dock labourers. Jones (1942) had 11 positives out of 14 samples of ground bone-meal which were incriminated in human and animal cases of the disease. Jamieson and Green (1955) reported the presence of *B. anthracis* in 3 specimens of bone-meal associated with human anthrax cases. Animal inoculation was the method used in all instances.

We decided to investigate all cargoes of imported bones destined for the chemical factory over a period of eighteen months. No attempt was made to select only those consignments whose processing was related to anthrax cases at the factory, though 2 such infections did occur during the period of the investigation.

Method

Animal inoculation appeared to be the most delicate method available (Wilson and Miles 1946).

The samples obtained consisted of 500 g. of coarsely crushed, but not powdered, bones. Only 1 sample was taken from each consignment. The whole sample was ground in a large mincing machine. The difficulty in this process varied from sample to sample, and there was generally a residue which was too hard to be broken down.

In accordance with the technique described by Jones (1942), the resulting powder was well mixed and then divided into 15 g. quantities, each of which was added to 150 ml. of sterile Ringer's solution. The whole was shaken at intervals over a period of three to four hours. This mixture was then heated at 65°C for five minutes and cooled. A volume of 100 ml. was centrifuged, 90 ml. of the supernatant were discarded, and the deposit was re-suspended in the residual 10 ml. 2 ml. of this final mixture was injected subcutaneously into a guineapig that had been passively immunised twenty-four hours before with 1000 I.U. *Clostridium welchii* antitoxin, 500 I.U. *C. septicum* antitoxin, 1000 I.U. *C. œdematiens* antitoxin, and 500 I.U. tetanus antitoxin.

The number of animals inoculated from each 500 g. sample depended on the amount of material suitable for injection after the grinding process was completed. Between two and nine animals were inoculated from each specimen.

There was a single departure from this routine, when a more elaborate survey of one particular ship-load was made.

6 samples of 500 g. each were taken from different parts of the hold and six animals were inoculated from each sample, making a total of thirty-six in all for the one cargo.

The macroscopic and microscopic diagnosis of anthrax in inoculated animals was confirmed by post-mortem cultures taken from the inoculation site and from the spleen.

Results

Samples representing 41 cargoes of bones yielded 5 positives (12·2%). 4 positive ship-loads came from Pakistan, and 1 from Syria.

The irregularity of distribution of anthrax spores within one 500 g. sample is shown by the following results:

One sample inoculated into seven guineapigs: positive in one only.
One sample inoculated into four guineapigs: positive in two only.
One sample inoculated into six guineapigs: positive in one only.

It is just possible, however, that the animals themselves varied to some extent in susceptibility, especially towards very small numbers of infecting organisms.

The more extensive survey carried out on one cargo, embracing 6 samples and thirty-six animals, yielded no positive isolations.

Out of a total of one hundred and eighty-three guineapigs inoculated, fourteen died of intercurrent infection due to clostridia, in spite of previous protective inoculation. The possibility that a few positive results were missed owing to premature deaths among the animals led us to try out cultural methods for detecting anthrax infection in the material.

Pour plates, made with a series of dilutions of the powdered bones, were employed in an attempt to obtain characteristic cultural appearances of *B. anthracis*, as described by Eurich (1912). The selective medium of Pearce and Powell (1951), containing lysozyme and hæmatin, designed for the isolation of anthrax spores from soil, was also used. Both cultural methods, however, proved to be completely unsuccessful with the heavily contaminated material under review.

Conclusions and Summary

Anthrax spores were demonstrated by animal inoculation in 5 out of 41 cargoes (12·2%) of imported bones over a period of eighteen months.

The sample examined from each cargo consisted of 500 g. of crushed bones only, and it often happened that only one out of many guineapigs inoculated developed anthrax. A result of this kind suggests that the proportion of cargoes found to contain infected bones was a very considerable underestimate. This would agree with a suggestion made in *The Lancet* (1952).

Cultural methods were found quite unsuitable for the material studied.

During the eighteen months of the investigation, in spite of the probable high incidence of infection in the raw material reaching the factory, only 2 cases of anthrax occurred among the workmen, suggesting that *B. anthracis* has a relatively low degree of infectivity for man. Similar conclusions have been reached in the past in the case of tannery workers dealing with infected hides.

We wish to thank Mr. J. R. D. Jenkins for considerable technical assistance and Mr. W. R. Williams, sanitary inspector, Llantrisant and Llantwit Fardre Rural District Council, who collected the specimens.

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VOMITING AND DIARRHŒA DUE TO COPPER IN STEWED APPLES

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CONTAMINATION of food by copper has long been recognised as a cause of illness. For example, Thomas Percival of Manchester (1785), in an account of the death of a 17-year-old girl, which he considered was the result of eating pickled samphire strongly impregnated with copper, stated:

"Notwithstanding the repeated warnings, that have been offered to the public, concerning those insidious poisons, which gain an easy, because an unsuspected, admission into the human body; few precautions have hitherto been taken against their baneful effects. Copper and lead, in one form or other, are employed in the construction of almost every culinary utensil; and, as these metals have been fully proved to be injurious to our system, the careless use of them puts us in daily hazard, not only the loss of health, but even of life itself."

This indicates the confusion at that time between the symptoms of copper and lead poisoning. As Lewin (1900) has pointed out, from the middle of the 18th century, copper was regarded as harmful, the symptoms of lead poisoning being transferred to copper and a pathology of copper poisoning similar to that of lead was constructed. Now that copper and lead poisoning are clearly distinguished, and because copper utensils have been largely replaced by ones of aluminium or stainless steel, illness attributed to accidental contamination of food by copper is rare; and the small outbreak recorded here may be of interest.

The Outbreak

Those affected fell ill soon after eating stewed apples prepared in a central school-meals kitchen on Nov. 24, 1954. About 60 lb. of apples were placed in a large tinned copper vessel, raised to the boil in about 15 min. and simmered for 35 min. The stewed apples were distributed to various school dining-rooms in aluminium-insulated containers and eaten by 87 adults and 458 children at their midday meal.

In one infant school, where some of the teachers noticed that the apples tasted slightly bitter, 9 children and 3 adults became ill. The children vomited almost immediately after eating the fruit. 1 child also had slight diarrhœa later in the afternoon while at school. 1 adult suffered from nausea all afternoon, and at 6 P.M. she vomited three times. Another vomited immediately after eating the fruit and the third had nausea about 30 min. after finishing the meal, and diarrhœa lasting 9 hours beginning at 1 P.M., her bowels being opened ten times in all.

The vessel in which the fruit was cooked was usually used with a heavily tinned inner container in which the food was placed so that it did not touch the inner surface of the copper itself. On this occasion the fruit was placed directly in the vessel whose tin lining had worn away in places exposing metallic copper. Before the experience of this outbreak I would not have thought that the amount of copper exposed would have dissolved sufficiently to cause symptoms.

Discussion

The toxicity of copper has been reviewed by Davenport (1953). Brightly polished copper is not readily attacked by food but in practice it is not possible to prevent the formation of a film of oxide which is more easily dissolved. Copper in contact with fruit juice and exposed to the air is rapidly dissolved (Monier-Williams 1949). For example, tomato purée prepared in copper evaporating plant could be sold containing up to 100 parts per million (P.P.M.) of copper (Chief Medical Officer's report for 1934)—now reduced under the Food Standards (Tomato Ketchup) Order 1949 to not more than 50 P.P.M.

A sample of the apples concerned in this outbreak was recovered from the pig bin, and contained 90 P.P.M. of copper. At this concentration the equivalent of the *B.P.* emetic dose of copper sulphate (gr. 5–10 of a 1% solution) would have been present in about 2 lb. of the fruit. According to Clark (1940) such a dose produces vomiting in a few minutes. It is unlikely that the distribution of the metal would have been even, and some samples would probably have contained more than this.

Of the 7991 outbreaks and family outbreaks of food poisoning notified to the Ministry of Health between 1939 and 1953, 19 were thought to be due to chemical agents and of these only 1 was caused by copper (Chief Medical Officer's reports, 1939–53). In that instance drinking-water became contaminated from a corroded geyser (Griffin 1951). Copper in drinking-water was also responsible for another earlier outbreak, where the water had been boiled in a large untinned, unlined copper (Hebblethwaite 1928).

In the case described by Percival (1785) a girl of 17 "amused herself whilst under the hands of the hairdresser, with eating pickled samphire, of which she consumed two breakfast plates full, amounting to 2–3 ounces." The samphire contained copper and she suffered from abdominal pain and vomiting and died 10 days later.

Meat and vegetable soup cooked in a copper vessel, the inside of which was "devoid of all characteristic appearance and was covered with incrustations which could be readily detached" was responsible for persistent diarrhœa among the inmates of a workhouse (Fosbroke 1883–84).

Gardner (1925) described a boy aged 5 who vomited after eating bread contaminated by particles of copper from a bronze bearing in a conveyor belt in which the flour used had been carried.

Symptoms due to contamination of fruit and vegetables are infrequent. Cases have been described where the vehicles for the copper were rhubarb (Sidney Smith 1948), peas (Dixon 1944), and spinach (Ceresa 1947).

The rhubarb case occurred in 1866 when one of a family who had eaten rhubarb, stewed in an imperfectly tinned and dirty copper vessel, had severe vomiting and died. The peas had been cooked in a partly tinned copper and produced violent diarrhœa and abdominal pains in 42 men of military units 8 hours after eating them. Samples of the peas thought to have produced the symptoms were not available for analysis, but trial peas cooked later in the same copper showed gr. 10·5 of copper per lb. The spinach had been boiled in a poorly tinned copper pot, and 3 of those who ate it suffered from acute abdominal pain, vomiting, diarrhœa of greenish colour with mucus and blood, and fever.

Recommendation

To avoid danger, when copper vessels are used for cooking fruit they must be adequately tinned. Sidney Smith (1948) mentioned that it was the custom for caterers to have their coppers retinned under contract arrangements three monthly. Local inquiry among caterers, canteens, and hospitals has shown that very few are now using copper vessels. Those that do have them retinned as necessary, usually about once a year.

Summary

A small outbreak of vomiting and diarrhœa was due to the contamination of stewed apples by copper. Other outbreaks of this rare kind of food-poisoning are mentioned.

My thanks are due to Dr. E. K. Macdonald, medical officer of health, Leicester, for his interest and encouragement; to Mr. F. C. Bullock, city analyst, for the report on the chemical analysis; to Dr. N. S. Mair, director, public health laboratory, for the bacteriological reports; and to Mr. T. W. Beresford, specialist sanitary inspector, who undertook the local inquiry into the use of copper vessels by caterers, &c.

References at foot of next column

Poliomyelitis Vaccination

Experimental findings which may prove of considerable importance to the ultimate success of poliomyelitis vaccination have been announced in *Science*. It is reported [1] that E. M. Zitcer, J. Fogh, and T. H. Dunnebacke, of the University of California, have cultivated all three types of poliomyelitis virus on human placental amnion. A vaccine prepared from virus grown in this way would be free from one of the possible disadvantages of the Salk vaccine—namely, the risk of sensitivity induced by monkey-kidney tissue. A vaccine that has been prepared in Sweden [2] is made with strains of virus grown on aborted human fœtal tissue.

First Quarter in Scotland

In the quarter ended March 31 this year [3] the birth-rate in Scotland was 18·3 per 1000 population, which was 0·3 less than the rate for the corresponding quarter of 1954 and 0·1 below the average for the previous five years. Stillbirths amounted to 25 per 1000 total births. The death-rate was 15·1 per 1000 population—0·8 more than in first quarter last year and 0·1 above the five-year average. The infant-mortality rate was 36 per 1000 live births (2 below last year's figure), and the neonatal death-rate was 22 per 1000 live births. Deaths from tuberculosis amounted to 25 (respiratory 22) per 100,000 population, compared with 31 (28) in the first quarter of 1953 and a five-year average of 46 (41).

Infectious Diseases in England and Wales

Disease	Week ended June			
	4	11	18	25*
Diphtheria	7	15	10	18
Dysentery	829	855	859	862
Encephalitis:				
Infective	1	1	2	3
Postinfectious	1	5	2	1
Food-poisoning	290	244	263	278
Measles, excluding rubella	24,687	27,722	21,832	20,515
Meningococcal infection	24	23	16	28
Ophthalmia neonatorum	30	34	46	34
Paratyphoid fever	5	7	11	23
Pneumonia, primary or influenzal	388	493	393	358
Poliomyelitis:				
Paralytic	26	35	21	34
Non-paralytic	5	9	8	20
Puerperal pyrexia	203	253	239	233
Scarlet fever	448	447	587	541
Smallpox	—	—	—	—
Tuberculosis:				
Respiratory	567	759	774	746
Meninges and C.N.S.	17	6	15	9
Other	67	97	105	81
Typhoid fever	3	1	6	1
Whooping-cough	1244	1781	1666	1823

*Not including late returns.

1. *New York Times*, July 1, 1955.
2. See *Lancet*, 1955, i, 965.
3. Quarterly Return of the Registrar-General, Scotland: Births Deaths, and Marriages registered in the quarter ended March 31, 1955. H.M. Stationery Office. Pp. 32. 2s. 6d.

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In England Now

A Running Commentary by Peripatetic Correspondents

The Lancet, may I respectfully suggest, Sir, has said some unkind things in its time about Dr. John Snow as an epidemiologist: thus in discussing his views on the harmlessness of decomposing matter and the noxiousness of infected water-supplies you wrote in 1855—"in riding his hobby very hard, he has fallen through a gully-hole and has never since been able to get out again," though in defence you might cite your comment on his work on chloroform "The man who has left us such a legacy cannot be said to have lived in vain." This morning you again proved your benevolent editorial neutrality by sending me as your peripatetic representative to watch the epidemiologists unveil a sign on the public house in Broadwick Street which has been renamed the *John Snow*. The house, formerly the *Newcastle on Tyne*, stands near the site of the notorious Broad Street pump which was the storm centre of the disastrous outbreak of cholera in 1854. On unveiling the sign, which bears a portrait of Dr. Snow by Mr. Cosmo Clark, Prof. Bradford Hill, F.R.S., commended the owners, Messrs. Watney Combe & Reid, for their gesture "of sincere respect to one of the outstanding figures in the history of British medicine."

No-one need be surprised, however, if Dr. Snow looks down from his sign with rather a quizzical air, for he was a life-long abstainer, relaxing only in his later years to drink an occasional glass of wine. His interest in drinking was indeed severely epidemiological. Cholera was rife in Scotland, he noted, partly because the national spirit was diluted with water infected beyond the antiseptic power of its alcoholic content. The young man who came to bury his brother, dead of cholera, paid the inevitable penalty of drinking water from the Broad Street pump with the brandy which capped his hurried lunch. Immunity to the spread of infection from the pump was obtained by workers in the local brewery who had a reasoned preference for their own product. (By an ironic chance, the only patient reported in the district during the epidemic in London in 1866 was a teetotaller). Snow noted such facts, dispassionately accepting them without prejudice as evidence one way or another. We suspect that he would accept with like equanimity the illogical but enduring tradition that we should commemorate our great men, whatever their personal tastes, in the names and signs of our inns. A scroll within the house describes his claim to immortality to the descendants of those in whose service he spent his too brief life. Already, visiting epidemiologists from overseas have called at the *John Snow* to toast the immortal memory, and to scratch their heads anew at this quaint country which can produce both so logical a genius and so paradoxical a memorial.

* * *

My son was right; every time I walked, my left foot went "plop" on the ground, and I soon convinced myself there was some weakness of the dorsiflexors. So there it was; I had foot-drop, and couldn't understand why. There didn't seem to be any local reason and I could only think some toxic cause was responsible, of which alcohol seemed the most likely. Pretty hard I thought, for I'd never had more than the average.

That night I tried to palpate my liver, and wasn't much pleased when my wife said I looked like a girl trying to feel her baby kicking. The next morning at breakfast to counter any further ribald remarks I gave a brief homily to the family on the serious nature of the condition; hinting that they might even lose their wage-earner, and leaving them very chastened, and myself feeling a complete cad, but half pleased that others had something to worry about too.

The anticlimax came a few hours later, when my daughter remarked casually that she thought the "plopping" noise must be due to the large flat metal stud I'd accidentally trodden on, and which was firmly driven into the sole of my shoe.

I am always surprised how many of my colleagues' minds are still immersed in the naïve evolutionary theories of the 19th century, which presents Science as the high and blessed region of clarity and light, and the Psyche as the muddy reptile-ridden swamp out of which man has painfully climbed, and which he must at all costs avoid if he is not to be again sucked down into its murky depths. All very true, perhaps, but a somewhat biased and over-anxious presentation of the Facts of Life. Nowhere is this clearer than in their reaction to any suggestion that we should examine the dream world in the clarifying light of objective science. They firmly refuse to treat it as an objective fact, worthy of the highest powers of reason, rather than as a peculiar specialty concerned chiefly with deranged minds. The Freudians, indeed, purport to explain the whole of human motivation by a simple *reductio ad penem*. If this were all that is to be found in the psyche, it might be as well for the generality of men to leave it alone. But it is not so. Bé of good cheer: by stepping boldly down again into the reptilian swamp you may uncover a crock of gold at least as often as a crocodile. To do this, however, involves a reassessment of some of the premises of Science; and while Science will urbanely discuss its conclusions, it simply hates to have its premises touched. "I love it, I love it, and who shall dare——?" says Science, and indeed one can well sympathise, for it is such a very comfortable armchair. From its depths hard words are hurled at the offending head; flying through the air come sticks and stones like "retrograde," "obscurantist," and inevitably "the Celtic twilight"—that heaven-sent phrase that has saved generations of scientists the pain of examining an inconvenient aspect of life.

* * *

How much better they order these things in America. The new art of "motivation" of doctors by the big drug houses, for instance, has been graphically portrayed in the *Sunday Times*. Instead of relying on the usual flood of pamphlets and rather pathetic importunism of travellers, one of the firms organised a nation-wide series of golfing meetings for doctors, including free green-fees, cocktails, a steak dinner, and balls stamped with the name of the druggist. No wonder their sales rose by 42% in a month. No explanation is given as to why one State was left out, but there the sales rose only by 2%.

A similar method of attracting attention to proprietary drugs in England might not please the Ministry of Health, but the Ministry could easily organise a rival golfing meeting with even bigger prizes. Perhaps British Railways would lend some of their courses for the event.

* * *

A patient phoned me this morning. She said, "I am speaking from a telephone chaos, doctor."

* * *

One of our housemen is wearing a permanent grin; but the more sensitive ward sister still shudders at the thought.

Last week on the senior physician's round, the dear old lady in bed 6, announced loudly to a recent arrival that the old gentleman was one of these out-of-date doctors who was taking a refreshment course. The clever young house doctor, she added, kindly took him round to see the interesting cases once a week.

* * *

News from school.—On Tuesday we investigated the lay-out of — — — Church in a Divinity Lesson. The vicar gave us an interesting talk about boars and highwaymen. I would not like to say which of the two he was. After this talk we went up the tower, I think without the vicar knowing it and we all climbed into the belfry. In this there was a large and complicated mass of machinery for working the bells. About twenty-five of us got among it. When we were all settled in there, lying between the spokes of the wheels and sitting on the axles the vicar began to ring the bells and, since the ground was quite a long way away it became quite dangerous. I myself was trying to get close to a bell to read the inscription on it when it began to ring, but I am still here. I had to write a letter to him to thank him for his kindness.

Letters to the Editor

ORAL PENICILLIN IN THE ELDERLY

SIR,—In most situations, penicillin remains the most widely used antibacterial agent and, inevitably, a large proportion of patients treated with this drug are elderly people. In those individuals, the infection requiring treatment is often sufficiently mild to justify the use of oral penicillin—with obvious advantages to doctors, nurses, and patients.

Practically nothing is known, however, about the effectiveness of oral penicillin in old people. It is notoriously difficult to assess the effects of a drug in older subjects by purely clinical observation, and we felt there would be greater practical value in showing whether or not effective blood-levels of penicillin could be obtained in old people—as has been shown in children and young adults—after the drug had been given by mouth. For no definable reason, we did not expect the results to be encouraging.

The report is based on a series of 43 patients whose ages ranged from 68 to 92 years. There were 20 women and 23 men. All were patients in acute geriatric wards. Oral penicillin was given experimentally, rather than therapeutically, to the selected subjects, and only those were chosen for the study who could be relied upon to coöperate. All subjects were willing participants in the trial, and consent was sought only after simple explanation of what was to be done and of what we were hoping to discover.

Two tablets (each containing 200,000 units benzathine penicillin) were given every six hours for four days, and patients took their meals at the customary times. Samples of venous blood were removed at appropriate intervals after the initial dose of penicillin to determine hourly penicillin levels (table I); and on the second, third, and fourth days of the experiment just prior to a dose of penicillin in order to find the minimal blood-levels (table II). The blood-penicillin levels were estimated by the dilution method.[1] In addition, an attempt was made in each case to assess the correlation between the penicillin levels and the state of hydrochloric acid production in the stomach, and the function of the kidneys—as far as this could be measured by simple means such as urine analysis for albumin, and specific gravity, and blood-urea estimation.

TABLE I—HOURLY SERUM-PENICILLIN LEVELS

Time after penicillin	1 hr.	2 hr.	3 hr.	4 hr.	5 hr.	6 hr.
Average values (units per ml.)	0·139	0·284	0·499	0·358	0·513	0·218
Lowest value recorded (units per ml.) ..	0·068	0·068	0·068	0·136	0·068	0·034
Highest value recorded (units per ml.) ..	0·544	0·544	1·088	1·088	2·176	1·088
No. of patients ..	17	25	17	25	17	25

TABLE II—DAILY SERUM-PENICILLIN LEVELS

Day of observation	2nd	3rd	4th
Average values (units per ml.) ..	0·288	0·326	0·295
Lowest value recorded (units per ml.)	0·034	0·068	0·068
Highest value recorded (units per ml.)	1·088	1·088	2·176
No. of patients	40	39	16

As shown in the tables, satisfactory penicillin blood-levels were obtained in every case. No significant difference could be found between patients who had achlorhydria and the others, nor between those who showed any signs of renal dysfunction and the "normals." There was a notable absence of diarrhœa, the only troublesome side-effect which we had expected.

The results, which ran counter to our expectations, seem to provide a rational basis for giving penicillin by mouth to elderly patients as an alternative to parenteral administration. Oral penicillin may be particularly convenient for elderly patients in the treatment of such conditions as mild cutaneous or respiratory-tract infections, and as a "prophylactic" in the presence of cardiac infarction or acute congestive cardiac failure.

We wish to thank those house-physicians, ward-sisters, and laboratory technicians, who helped us in this study. Benzathine penicillin ('Permapen') oral tablets were supplied by Pfizer Ltd.

Perth Royal Infirmary and Bridge of Earn Hospital.

JOHN H. PRAIN
RONALD G. SIMPSON.

1. Recent Advances in Clinical Pathology. London, 1951; p. 116.

ARTIFICIAL RESPIRATION BY INTERMITTENT POSITIVE PRESSURE

SIR,—Professor Pask (June 25) gives a useful warning in pointing out that some respirators sold for providing intermittent positive-pressure respiration have so poor a flow-rate as to be virtually useless for this purpose. The pressures attained close to the tracheal tube are largely influenced by the flow-rate from the respirator, and I entirely agree with Professor Pask that the duration of inspiration required for a given tidal air is affected by this. I did not go into this problem in my paper (May 28), but Dr. Young and I have a paper in the press in which the relationship between tidal air and the rate of rise of pressure at the tracheal tube is considered in more detail, and our findings are in general agreement with those expressed by Professor Pask.

The Radcliffe Infirmary, Oxford.

J. M. K. SPALDING.

SELECTION OF BLOOD FOR TRANSFUSION

SIR,—In their interesting and instructive article of June 25, Dr. Mollison and Miss Cutbush describe a case in which P-positive red cells were hæmolysed rapidly when transfused to a patient whose serum contained anti-P agglutinins. P-negative cells showed a normal survival. Anti-P is probably the commonest of the naturally-occurring irregular agglutinins to be found in human serum and, although it has generally been considered that such antibodies, and similar ones such as anti-A_1, anti-M, and anti-N, may be ignored when matching blood for transfusion, providing they are not clearly demonstrable at 37°C, Dr. Mollison and Miss Cutbush's report suggests that a revision of practice may be desirable.

Many laboratories already cross-match blood at room-temperature as well as at 37°C and this serves to detect most instances in which strong irregular agglutinins of this type are present in the recipient's serum. At the South West Regional Transfusion Centre our practice for many years has been, besides the routine tests at 37°C, to carry out a cross-matching test against saline-suspended donor cells at blood-bank temperature (4–6°C) in preference to one at room-temperature. This temperature was chosen for the following reasons:

(1) ABO incompatibility is more marked at 4°C than at room-temperature.

(2) Possible complications in reading the test from the presence of strong anti-A or anti-B hæmolysins in the recipient's serum are practically eliminated.

(3) Even weak anti-P, anti-M, and anti-A_1 agglutinins are detected at this temperature when the proposed donor blood contains the corresponding antigen.

Whenever time and circumstances permit, any donor bloods agglutinated at 4°C are deemed unsuitable for the patient, and further bottles are cross-matched until sufficient "compatible" bottles have been found. This procedure has proved satisfactory in practice and, providing a control is included of the recipient's own cells suspended against his serum at 4°C, the possible complication of cold auto-agglutinins can be detected and ignored.

Although it may be argued that agglutinins such as anti-P are of no clinical importance, unless active at body-temperature, we have had personal experience of 4 cases where antibodies of this type have exhibited an increase in thermal amplitude and potency as a result of transfusion and/or pregnancies. Similar cases have been reported.[1 2] It is clear therefore that, in at least a proportion of cases in which these antibodies are present in the recipient's serum, they must be regarded as potentially "dangerous," and it would seem only to be in the patient's best interest to find donor blood whenever practicable that is not agglutinated at 4°C as well as 37°C.

South West Regional Transfusion Centre, Bristol. GEOFFREY H. TOVEY.

A NEW ENTERIC ORGANISM

SIR,—After your annotation of June 25, I should like to remark that the occurrence and clinical rôle of the special group of micro-organisms described by McDonald et al.[3] had been noted as early as 1929 by Kristensen and Bojlén [4] and more extensively in 1937.[5]

Under the designation *Salmonella java*, Dr. Kauffmann now groups all strains which serologically belong to the type *S. paratyphi B* but ferment *d*-tartrate and do not produce slime-wall. That the "atypical paratyphoid bacilli" mentioned belong to this group is evident partly from the descriptions by the English authors, and partly from a re-testing, just made by Dr. Kauffmann, of one of the English strains.

The absence of dulcite fermentation and of the non-specific phase is not common to all strains of the group *S. java*; subtypes have been established by their behaviour towards dulcite, rhamnose, and inosite.

S. java provides a very good example of a special kind of pathogenicity (acute enteritis) "associated quite strictly with" a definite combination of "biochemical habit" (*d*-tartrate fermentation) and "antigenic structure" (serological identity with *S. paratyphi B*).

Statens Seruminstitut, Copenhagen. MARTIN KRISTENSEN.

MENTAL RETARDATION

SIR,—Dr. Alford (June 18) pleads that the mentally retarded child should be recognised as in every other respect normal and be given more understanding and sympathy.

While I agree with most of what Dr. Alford says, from my experience with educationally subnormal children—and especially the adults in charge of them—a slightly different emphasis seems necessary.

Understanding and sympathy are, in any human, strictly limited quantities, depending first on the giver, and secondly on the response. Unless able to reinforce understanding by reason, the adult is only too apt to behave like Lady Catherine De Bourgh, who, when her parishioners were "quarrelsome, discontented or too poor," was accustomed "to silence their complaints and to scold them into harmony and plenty."

To say that these children are normal in every other respect but handicapped in mind is to give only part of the truth. They differ from others not only because their reasoning power, judgment, memory, and concentration are weaker but also because their instinctual drives are, or appear to be, stronger. The explanation here is that the urge for immediate satisfaction does not receive the same continuous, growing check from the developing ego, and from recognition of connections in the outside world. The postponement of gratification, which is the hallmark of civilisation, is a less well recognised necessity. We have then the only too common outbursts of temper in the school and in the home, as well as the large number of sexual problems, in the growing adolescents. The understanding these children require should extend to the type of influence which is most successful, and that is the emotional atmosphere in which the child lives.

When one considers the kind of homes most of the children come from, they seem to be largely of two types: (1) those in which level of intelligence is generally low and where, partly in consequence, various social evils have been at work for many years; and (2) intellectually superior homes, in which there may be no social evils but the child may be harmed by rejection and resentment. With the second type of home a rational, sympathetic approach is often successful, though it may come too late. With the first type only palliative remedies, applied to the child, can be used. When an educationally subnormal child has acquired faulty, violent responses to the world, the most one can hope for is to modify them slightly.

London, S.W.15. HEDY SYMONDS.

CHLORPROMAZINE AND EPILEPSY

SIR,—The ethics of medical research are rightly causing much concern at present. I feel that some comment should be made on the letter from Dr. Fabisch in your issue of June 18.

Dr. Fabisch explains that chlorpromazine is known to be a possible cause of convulsions. He reports that a convulsion recently occurred during electro-encephalography in a patient under *treatment* with chlorpromazine. Presumably he concluded that chlorpromazine would be likely to increase the abnormality of the E.E.G. in epileptics and might well cause frank convulsions. He reports that chlorpromazine was then given to 14 epileptics and was in fact found to increase the abnormality of the E.E.G. in 7. His conclusion is that "caution may be advisable in treating patients with the drug."

If this experiment had been carried out entirely on adults with their consent freely given after full and clearly understood explanation, then, of course, no criticism could have been made. But how can the use of at least one child in such an experiment be justified? The risk to the child was slight; but if there had been a mischance what explanation could have been given?

A mischance in treatment can be understood and is a risk that must often be accepted; but how could this be called treatment when the anticipated effect was to aggravate, however temporarily, the manifestation of the patients' disease?

London, N.1. R. E. W. FISHER.

*** We have shown this letter to Dr. Fabisch, who writes as follows:

SIR,—The investigations were carried out after consent had been obtained from all adults, after full explanation of the purpose of the investigation and possible side-effects. In the case of the child, the matter was explained to the mother carefully and in detail, and her consent obtained. The mother remained sitting by the side of the child throughout the investigation, as it is customary in E.E.G. examinations of children who come as outpatients to this hospital.

The purpose of the investigations referred to is to elucidate the effect of chlorpromazine on the E.E.G. of epileptics. References in the English and American literature are scanty and so far no significant changes appear to have been reported.[1–3] For this reason the

1. Mollison, P. L. Blood Transfusion in Clinical Medicine. Oxford, 1951.
2. Levine, P., Ferraro, L. R., Koch, E. *Blood*, 1952, **7**, 1030.
3. McDonald, J. C., Price, A., Taylor, J. *Mon. Bull. Minist. Hlth Lab. Serv.* 1955, **14**, 83.
4. Kristensen, M., Bojlén, K. *Zbl. Bakt.* 1929, **114**, 86.
5. Kristensen, M. *Bibl. Læger*, 1937, **129**, 390. Bojlén, K., Clemmesen, C., Lomholt, M. *Ibid*, p. 401. Kristensen, M., Kauffmann, F. *Z. Hyg. InfektKr.* 1937, **120**, 149.

1. Benassi, P., Cenacchi, G. *Electroencephalography clin. Neurophysiol.* 1953, **5**, 221.
2. Chagass, C. *Ibid*, 1955, **7**, 306.
3. Samad, I. A. *Lancet*, June 25, 1955, p. 1327.

effects observed were not expected. From the results obtained until now it appears that in patients with unstable and abnormal inter-seizure recordings the abnormal phenomena increase in frequency of occurrence and/or duration after intravenous chlorpromazine. Whether these are the same patients who are more likely to have a seizure while receiving chlorpromazine (by the intramuscular or oral route) than those with a stable recording cannot be ascertained from the data obtained so far. But the findings suggest a method of excluding perhaps some patients from chlorpromazine medication who otherwise might suffer a "mischance in treatment."

The effect of chlorpromazine as used in these investigations is similar to that observed on activation of the E.E.G. by hyperventilation and photic stimulation. Both these methods are used routinely in E.E.G. work with children and adults. Well-known effects in epileptics of these two recognised and accepted methods are the provocation of significant abnormal phenomena or their increase in frequency of occurrence and/or duration. The additional information obtained in this manner increases the clinical usefulness of the E.E.G., and the very slight risk of causing a seizure is therefore accepted as justified. The ethics of using hyperventilation and photic stimulation are, I think, not in doubt.

Nottingham. W. FABISCH.

THE MERRYGOWHIMBLES

SIR,—I was most interested in the Widdicombe letter in your issue of June 11. Surely a little soap and water applied to the hands at suitable times would check the onrush of *Shigella sonnei*. I am proud to be a member of the St. John Ambulance Association, which offers courses to all food-handlers, which may not only bring freedom from food-poisoning and infection to the consumer of their products, but also enable the candidates successful in the examination to obtain a decorative certificate which they can hang up on their wall.

London, S.W.1. JOHN ELTON.

MODIFICATIONS OF THE BLEASE PULMOFLATOR

SIR,—The Blease pulmoflator has recently been modified for use both in anæsthesia and in the ventilation of paralysed patients.

There are two significant changes from the original design for anæsthesia. A negative-pressure phase has been added which allows a negative pressure of up to 5 cm. of water to be applied during expiration. In practice this gives an adequate tidal volume of respiration with a smaller positive pressure during inspiration than is necessary with the standard model. To avoid obstructing venous return, a prolonged expiratory pause is necessary during artificial respiration by simple intermittent positive pressure, and this pause is greatly reduced by the phase of negative pressure.[1]

The other modification of the machine is the fitting of a spring-loaded leak to the compression chamber. This causes a change in the inspiratory curve, bringing it nearer to that produced by manual compression of the reservoir bag, and this appears to produce better filling of the lungs for a given inspiratory compression.

When the machine is intended for the artificial respiration of paralysed patients a different head is supplied with it. This incorporates a non-return expiratory valve so that there is no rebreathing. Air is drawn into the concertina reservoir during the expiratory pause, with a special inlet for oxygen if required. The oxygen percentage in the inspired air can be calculated from an observation of the tidal air. This is calculated directly from a scale and pointer attached to the concertina, and from the respiratory rate.

The length of inspiration and expiration can be adjusted independently. The pressure in the inspiratory phase can be varied from 4 to 30 cm. of water, and in expiration the pressure can be adjusted to between 0 and −5 cm. of water. This wide range of control makes it suitable for use in children as well as adults.

An efficient sucker and a simple humidifier are incorporated in the machine, but a more elaborate thermostatically controlled humidifier, as described by Marshall and Spalding,[2] can be used. The apparatus is so quiet that it can be used in an open ward, and it is suggested that a warning bell should be fitted lest there should be an electrical failure under such conditions.

We are grateful to Mr. J. Blease for allowing us to try his latest modification of the apparatus, which is now being manufactured for use in this country.

A. I. PARRY-BROWN
The London Hospital, E.1. S. D. K. STRIDE.

LOW-LACTOSE MILK FOR CONGENITAL GALACTOSÆMIA

SIR,—In your issue of June 4 Mr. Salt, Dr. Ross, and Dr. Gerrard recommend a low-lactose synthetic milk powder for the treatment of congenital galactosæmia. We feel that the clinical and biochemical data as reported do not entirely justify their recommendation and that in different circumstances it may even be harmful.

The authors introduced the synthetic milk when their patient was seven months old and presumably on a weaning diet. Thus the total amount of "milk" offered would be smaller and the quantity of ingested galactose reduced.

The baby's admission to hospital at the age of three months suggests that the disease was not of the severity that can be fatal in the first few weeks of life. The authors' finding of a blood-galactose level of 18 mg. per 100 ml. forty-five minutes after a test feed indicates that this preparation must have contained considerably more than 2·8 mg. of lactose. The rapid disappearance of small amounts of galactose from the blood is not necessarily due to successful katabolism of this sugar. We have shown that in galactosæmic infants galactose accumulates in red blood-cells (and presumably also in other cells) in the form of galactose 1-phosphate [3] and that the metabolism of cells containing this phosphate is impaired.[4] Preparations containing only small amounts of galactose, when given over an extended period, could well lead to similar accumulations, and our own experience has shown that in a severe case 0·5% of galactose (as found in casein hydrolysate) can lead to cataract formation within three weeks.

May we therefore plead for the use of a completely galactose-free diet and offer one which has proved most successful in the treatment of a number of cases.[5] It is based on a formula published by Moll and Stransky [6] as a form of milk-free diet for cases of infantile gastro-enteritis. It can be prepared by any intelligent mother in the ordinary household and does not require the expenditure of dollars or any special import licence.

The "pudding" provides a high caloric food with all the essential components of fat, protein, and carbohydrate, but needs to be complemented with calcium and the usual vitamins. It is prepared as follows:

Stage I.—Stir 6 ounces of a milk-free cereal (e.g., Robinson's groats) with 14 ounces of water.
Stage II.—Mix thoroughly 3 ounces of sugar and 2 egg-yolks.
Stage III.—Beat 2 egg-whites, a pinch of salt, and a pinch of bicarbonate of soda.

All the ingredients are finally mixed, put into a pan which has been greased with a vegetable margarine, and dusted with the cereal. The mixture is then heated for half an hour in boiling water. One part of the strained pudding is mixed with an equal part of boiled water. Each ounce of this preparation contains approximately 30 calories. For very young babies one-third of pudding to two-thirds of water can be used initially.

A. HOLZEL
G. M. KOMROWER
Department of Child Health, University of Manchester. V. SCHWARZ.

1. Hubay, C. A., Waltz, R. C., Brecher, G. A., Praglin, J., Hingson, R. A. *Anesthesiology*, 1954, **15**, 445.
2. Marshall, J., Spalding, J. M. K. *Lancet*, 1953, ii, 1022.
3. Schwarz, V., Golberg, L., Komrower, G. M., Holzel, A. *Biochem. J.* 1955, **59**, xxii.
4. Schwarz, V., Golberg, L., Komrower, G. M., Holzel, A. *Ibid* (in the press).
5. Holzel, A. *Med. ill.* 1954, **8**, 44.
6. Moll, L., Stransky, E. *Jb. Kinderheilk.* **100**, 3.

POLIOMYELITIS AND REMOTE TONSILLECTOMY

SIR,—The Medical Research Council committee (July 2) conclude that persons whose tonsils have been removed are more likely to have the bulbar form of poliomyelitis than those who have not had the operation, even if years have elapsed between the removal of the tonsils and the onset of poliomyelitis. They are not in favour of a theory that there may be some local condition of the pharynx which, on the one hand, is an indication for tonsillectomy and, on the other, makes the child more liable to bulbar poliomyelitis even after the operation.

Though I am not an ardent tonsillectomist I think we should pause and consider this point in more detail. Lacey [1] says: "In man the incidence of paralysis has been . . . possibly slightly greater in heavier children and in persons with a particular recessive gene, fair hair, or of mongoloid or subendocrinopathic type characterised by a tendency to growth without corresponding development, hypogonadism, and various stigmata."

Now the incidence of tonsillectomy itself varies in different types. It is, for instance, much more common in asthmatic children. I have shown [2] that children and university students who have postnormal occlusion of the teeth are more likely to have suffered this operation. The postnormals may well belong to the subendocrinopathic type mentioned by Lacey. I think that there may be a common cause for both the tonsillectomy and the attack of poliomyelitis, and this could be a local one connected with the development and shape of the mouth and jaws.

Bath. HUGH R. E. WALLIS.

SIR,—I doubt whether it is fair to contrast a group of tonsillectomised children with a control group of average children. The former presumably have a poor resistance to upper respiratory infections, and it would therefore be reasonable to expect a more severe attack of poliomyelitis in this group than in a group of average children.

Hove. G. A. FRASER.

BAYTENAL IN PSYCHIATRY

SIR,—'Baytenal' is a recently introduced thiobarbiturate consisting of the sodium salt of 5·5 allyl-(2-methylpropyl)-thiobarbituric acid. It is a yellowish powder easily soluble in water producing a solution having an alkaline reaction. The drug is dispensed in vials containing 1 gramme and it is used intravenously as a 10% solution. Good results have been reported in over 350 cases where baytenal was used as a short-acting anæsthetic.[3]

Preliminary investigation in psychiatric cases indicates that it is useful in securing a rapid safe coma prior to electroconvulsive therapy (E.C.T.), either with relaxants or alone.

Following its use in E.C.T., I have used a new technique conveniently referred to as narco-relaxation in cases where tension is a prominent feature. I explain to the patient that the treatment will not necessarily cure his condition, but he will secure rapid relief from his tension and anxiety and this will enable him to cope with his difficulties more satisfactorily by the breaking of the vicious circle that is usually operating in neurotic conditions.

The patient lies in bed with the head propped up and the arm to be used for the injection is placed in a comfortable position. 1–1½ ml. of 10% baytenal solution is injected into a suitable elbow vein over a period of 50–70 seconds. The patient is asked to state when he feels the effects of the drug and this is usually 1–1½ min. after the injection begins; there is much relief from tension and a feeling of well-being. The baytenal is thereafter injected at the rate of 1 ml. during each 5 min. or alternatively 0·2 ml. may be injected at minute intervals.

This procedure maintains the patient in a state of contented relaxation without impairment of consciousness. At any time during the injection sopor or sleep may be produced by increasing the rapidity of the injection, and withholding the drug for a minute or two will bring the patient back to consciousness. At the end of 25 min. the needle is withdrawn. He may dress 5 min. later and he is usually able to leave the hospital 10 min. or so after cessation of treatment. It is desirable that he be accompanied. He should have been advised not to have a meal for about 3 hours prior to having the treatment. For elderly patients gr. 1/100 atropine should be given before the treatment. The treatment may be repeated at weekly intervals.

No side-reactions, vomiting, or drug rashes have been noted and excitement does not occur.

I have found baytenal narco-relaxation a great help in the treatment of cases of neurosis where tension is prominent, and also in tension states accompanying paranoid schizophrenia.

Barnsley Hall Hospital, Bromsgrove, Worcestershire. M. G. MCCOLL.

NOISE IN HOSPITAL

SIR,—For about a week recently I was a patient in a large provincial hospital where I was treated with great efficiency and kindness, but the incessant noise from early morning until late at night was wearing to the stoutest nerves.

The most trying thing was the slamming of doors—cars, lorries, ambulances, room doors, cupboard doors, and above all the entrance door to the ward. Wooden floors are not quiet, and the tramping of feet went on all day. Furniture and utensils, crates, tins, and pails were pushed and dragged, dropped, flung, and bumped about, and laden trollies clattered and rattled on their way. So it was not surprising that repairs were necessary and there seemed to be plenty of energetic workmen with hammers. Then there was the loudspeaker calling Dr. So-and-So, and the telephone, both in constant use.

These were just some of the noises which, it seems to me, tend to undermine the good the hospital is doing for the patient. Much of this noise is quite unnecessary and could be prevented, and I know there are hospitals where much has been done in this direction. It is to be hoped that all hospitals will soon tackle this matter seriously and see to it that all unnecessary noise is eliminated.

London, N.W.3. IDA SEYMOUR.

ADENOSINE TRIPHOSPHATE IN PAROXYSMAL TACHYCARDIA

SIR,—We would like to add some observations to Dr. Somló's letter and your annotation of May 28.

So far we have given over 300 intravenous injections of adenosine triphosphate (A.T.P.) ('Atriphos') to 52 patients suffering from supraventricular paroxysmal tachycardia. Single doses of 10–70 mg. have been used without harmful side-effects. Only exceptionally is it necessary to exceed 40 mg. If so, we give the dose in two parts, the second 20–30 minutes after the first. Only when the attack is over, during the shift to normal rate, have we observed a few seconds' asystole accompanied by severe malaise, but no permanent effect.

One patient who had very frequent attacks received 53 injections at this hospital and 130 at other institutions—a total of 183 in less than four years. This patient had hypertension and signs of myocardial damage. We tried to relieve the first attack with various drugs, but three days' treatment did not stop it. The heart began to fail on the fourth day, so we decided on intravenous A.T.P. The response was prompt. Since then the patient has had many attacks and has been given A.T.P. each time, yet the cardiac condition is compensated, and the electrocardiogram has shown no change during the whole period.

Neither in this case nor in others where physical measures and sedatives have been ineffective can we

1. Lacey, B. W. *Lancet*, 1949, *1*, 849.
2. *Dent. Rec.* 1953, *73*, 519.
3. *Disch. med. Wschr.* 1954, *79*, 601.

see any justification for delay in giving A.T.P. Our experience warrants the conclusion that A.T.P. is clearly indicated in paroxysmal tachycardia.

In patients seen for the first time in an attack, we do nothing until an E.C.G. has been taken. We think this is important for two reasons: the prognosis varies with the type of paroxysmal tachycardia; and during the intervals between attacks, treatment varies according to the cause of the attacks. In paroxysmal tachyarrhythmias, for example, hyperthyroidism may be responsible.

Finally, we should like to add that the prompt and excellent effect of intravenous A.T.P. in paroxysmal tachycardia suggests that it has a specific action, and that there is a connection between the rise and fall in the adenosine-triphosphate content of the myocardium and the onset and subsidence of attacks.

K. KOMOR
ZS. GARAS.

Municipal Hospital, Budapest.

ECLAMPSIA TREATED WITH CHLORPROMAZINE

SIR,—During the pharmacological investigation of chlorpromazine, it was noted that it potentiated the action of anæsthetic, hypnotic, and analgesic drugs, so producing a state of somnolence.[1] The changes both in behaviour and in the electro-encephalogram after the administration of chlorpromazine resembled strikingly the findings of Magoun et al.[2 3] in monkeys in which the ascending pathways from the centrally placed reticular formation in the brain stem had been interrupted. This and other neurophysiological findings suggested that the action of chlorpromazine could be explained by a suppression of the awakening upward discharge from the ascending reticular formation.[4]

In view of these findings indicating a central depressant action with a marked affinity for the hypothalamus, a clinical trial of chlorpromazine was undertaken in cases of eclampsia in Chittaranjan Seva Sadan.

During the period October, 1954, to March, 1955, 46 cases of eclampsia were treated as follows:

Time (hr.)	*Chlorpromazine*	*Promethazine*
0	25 mg. (i.v.)	25 mg. (i.v.)
1	25 mg. (i.m.)	—
5	25 mg. (i.m.)	25 mg. (i.m.)
12	25 mg. (i.m.)	—
20	25 mg. (i.m.)	25 mg. (i.m.)

At the end of the first hour 50 ml. of 50% glucose solution and 5 ml. of 10% calcium gluconate solution were given intravenously.

Only 1 out of 46 patients treated died. 14 babies were born dead; in 12 of these cases fœtal heart-sounds could not be heard before treatment began. In this series 38 were primigravida; 18 had antepartum, 20 intrapartum, and 8 postpartum eclampsia. 9 had more than ten fits and 8 more than twenty fits before treatment. After treatment was started, there were less than ten fits in 28 cases and more than ten fits in the remaining 18 cases.

The range of fall of blood-pressure was variable. The drop in the first hour after treatment began varied from nil to 80 mm. Hg, the average being 36 mm. Hg. Psychosis developed in 4 patients: in 2 it lasted for four days and in the other 2 for thirty days.

It is too early to draw any conclusions from these data, but this small series suggests that eclamptic patients are very susceptible to the action of chlorpromazine.

SUBODH MITRA
Director
KANAK DAS GUPTA
Deputy Visiting Surgeon.

Chittaranjan Seva Sadan, Calcutta.

1. Courvoisier, S., Fournel, J., Ducrot, R., Kolsky, M., Koetschet, P. *Arch. int. Pharmacodyn*, 1953, **92**, 305.
2. Magoun, H. W. The Harvey Lectures, 1951–52. Baltimore; p. 53.
3. Frech, T. D., Magoun, H. W. *Electroenceph. clin. Neurophysiol.* 1949, **1**, 48.
4. Das, N. N., Dasgupta, S. R., Warner, G. *Arch. int. Pharmacodyn*, 1954, **99**, 451.

BLOOD-GROUPS AND REPRODUCTION

SIR,—The first large investigation in which the sex and the ABO blood-group of newborn infants was recorded was a painstaking series of 2331 Hamburg infants reported in 1930 by Haselhorst.[1] From 1924 to 1930, however, seven very much smaller European series, giving a total of 1658 infants, were reported,[2–8] as well as some others of which the details are unobtainable at present. In these seven series taken together the sex-ratio of the infants of the same group as their mother is highest for B, intermediate for O, and lowest for A, and the same descending order is found in Haselhorst's series. All eight series are combined in table I.

In 1951 Sanghvi [9] reported on 864 New York infants, and in 1954 Johnstone [10] on 2429 London infants (these are combined in table I with 151 studied by Hurst et al.[11]); and in both series the sex-ratio of the infants of the same group as their mother is again highest for B and lowest for A. (The ratio for AB ex AB in all the series combined is 1·03—31 : 30.) The significantly low sex-ratio of the A infants ex A mothers, as compared to O ex O and B ex B, in his New York series (as in his non-white series of 1330 infants) was the predicate of Sanghvi's communication. The present finding of earlier data which, like Johnstone's, reproduces Sanghvi's seminal observation arose from belated consultation of a source-book [12] which has long been out of print. If Sanghvi's results were further confirmed it would be interesting to compare them with those for infants with hæmolytic disease, for such are unrepresentative in respect of birth-rank and ABO group distribution.

TABLE I—SEX-RATIO OF WHITE NEWBORN INFANTS OF THE SAME ABO BLOOD-GROUP AS THEIR MOTHER

Miscellaneous authors (1924–30)				Miscellaneous authors (1946–54)		
Male infants	Female infants	Group of mothers	Ratio of male to female infants	Group of mothers	Male infants	Female infants
156	128	B	1·22	1·31	B	77	59
489	455	O	1·07	1·10	O	565	513
529	535	A	0·99	0·96	A	442	461

In all the foregoing (white) series combined, excluding that of Grunfeld and Schmundak,[6] from which the data are not extractable, the sex-ratio of the infants of a *different* group from their mother is 1·12 (271 : 243) for the B infants of non-B mothers, 1·05 (549 : 525) for the O infants of non-O mothers, and 1·03 (529 : 516) for the A infants of non-A mothers. (In Koller's series [13] of 400 infants of undifferentiated parentage the descending order is B–O–A.) On the other hand, the ratios are 1·12 (567 : 505) for the non-A infants of A mothers, 1·02 (239 : 235) for the non-B infants of B mothers, and 0·97 (505 : 520) for the non-O infants of O mothers. In the series of Hirszfeld and Zborowski [3] much the highest sex-ratio—2·87 (23 : 8)—was that of the infants of (all) AB mothers, and the authors remarked that "If this finding were confirmed it would have far-reaching theoretical significance." Their own series apart, however, the descending order of sex-ratios of the infants of all mothers is B mothers (1·12), AB mothers (1·06), O mothers (1·05), A mothers (1·02).

In 1000 of Haselhorst's cases [1] the group of the father also was noted, while Johnstone [10] grouped 2100 families with 2100 newborn infants and 1691 of their sibs. Johnstone pointed out that in these 2100 families the sex-ratio of the infants was *lowest* for the infants of B fathers, and in Haselhorst's series this ratio is second lowest. Indeed when the series are combined, omitting the families in which the parents have both the same group (table II), the descending order of sex-ratios of

1. Haselhorst, G. *Z. KonstLehre*, 1930, **15**, 177.
2. Dossena, G. *Ann. Ostet. Ginec.* 1924, **46**, 335.
3. Hirszfeld, L., Zborowski, H. *Klin. Wschr.* 1925, **4**, 1152.
4. Badino, P. *Riv. ital. Ginec.* 1927, **6**, 656.
5. Klaften, E. *Mschr. Geburtsh. Gynäk.* 1927, **76**, 91.
6. Grunfeld, W., Schmundak, D. *Ukr. Zbl. Bludgr.* 1928, **3**, 154.
7. Kirwan-Taylor, G. K. *J. Path. Bact.* 1930, **33**, 313.
8. Goroncy, C. *Z. Geburtsh. Gynäk.* 1930, **97**, 30.
9. Sanghvi, L. D. *Nature, Lond.* 1951, **168**, 1077.
10. Johnstone, J. M. *Brit. J. prev. soc. Med.* 1954, **8**, 124.
11. Hurst, J. G., Taylor, H. C., Wiener, A. S. *Blood*, 1946, **1**, 234.
12. Lattes, L. Individuality of the Blood. London, 1932.
13. Koller, T. *Arch. Klaus-Stift. VererbForsch.* 1926, **2**, 247.

TABLE II—SEX-RATIO OF WHITE NEWBORN INFANTS AND SOME OF THEIR SIBS, FROM ASYMMETRIC ABO MATINGS OF HASELHORST (1930) AND JOHNSTONE (1954)

Male infants	Female infants	Group of fathers	Ratio of male to female infants		Group of mothers	Male infants	Female infants
88	55	AB	1·60	1·25	B	223	178
601	563	O	1·07	1·03	A	594	576
569	558	A	1·02	1·02	O	567	555
212	227	B	0·93	0·91	AB	86	94

the offspring of mothers—namely, B–A–O–AB—is completely reversed in the infants of fathers. (See also Allan.[14]) Furthermore, the combined series have appreciably fewer (female) infants of B mothers than of B fathers; and there are also markedly fewer daughters than sons of AB fathers. Whether this shortage of infants of B mothers, if confirmed by further studies, exists from conception or is caused by intra-uterine selection might be decided by comparison of the blood-group distribution of the offspring as well as the parents in abortion, stillbirth, malformation, prematurity, and postmaturity. Comparison of engaged couples and sterile couples might also be illuminating.

In this connection it is of interest that in 52 toxæmic pregnancies reported by Dossena [15] and in 57 random pregnancies reported by Goroncy the shortest mean period of gestation was that of the female offspring of the B mothers. (Dossena's toxæmic series has an excess of B mothers.) In Grunfeld and Schmundak's series,[6] too, the ratio of full-term to non-full-term offspring (of undifferentiated sex and blood-group) was 2·34 (124 : 53) for the O mothers, 2·00 (180 : 90) for the A mothers, and only 1·53 (141 : 92) for the B mothers. This may partly explain why the mean duration of labour was about 17 hours for the O mothers, 14 hours for the A mothers, and only 12·5 hours for the B mothers. Again, Grubb and Sjöstedt's series [16] of 737 marriages, as the authors point out, has an excess of B and AB wives with a history of abortion. It is also worthy of note that in the series of Grunfeld and Schmundak the ratio of mothers whose age at menarche had been earlier than 13 to those in whom it was later than 17 was 4·33 (26 : 6) for O, 4·14 (29 : 7) for A, and only 1·60 (16 : 10) for B. (See also Vuori.[17])

Following Koller [18] (in a series of 26 twins), Goroncy [8] recorded the length as well as the weight of 285 infants, including the foregoing 57, and the shortest mean length was that of the female infants of the B mothers (table III). The B mothers' infants (of undifferentiated sex) were, on average,

TABLE III—GESTATION PERIOD AND BODY-LENGTH OF WHITE NEWBORN INFANTS

Data of Dossena (1925)					Data of Goroncy (1930)		
Mean gestation period (mos.)		Group of mothers	Ratio of male to female infants		Group of mothers	Mean body-length (cm.)	
Male infants	Female infants		Gestation period	Body length		Male infants	Female infants
8·62	6·57	B	1·30	1·05	B	50·8	48·6
8·50	7·58	A	1·12	1·02	O	50·7	49·5
8·62	8·00	O	1·08	1·02	A	51·3	50·1

lighter than those of the O and A mothers in the series of Goroncy,[8] Hirszfeld and Zborowski,[18] and Klaften,[5] but were heavier than them in the series of Haselhorst,[1] Badino,[4] and Epstein and Podvinec.[19] The descending order of mean weights of infants of undifferentiated sex was A–O–B in the series of Hirszfeld and Zborowski and of Haselhorst, but was A–B–O in Goroncy's series.

Aberdeen and North-East of Scotland Blood Transfusion Service, Bacteriology Department, University of Aberdeen. T. M. ALLAN.

14. Allan, T. M. *Lancet*, 1954, ii, 1022.
15. Dossena, G. *Ann. Ostet. Ginec.* 1925, **47**, 608.
16. Grubb, R., Sjöstedt, S. *Ann. hum. Genet.* 1955, **19**, 183.
17. Vuori, A. K. *Acta Soc. Med. 'Duodecim,'* 1929, **12**, 1.
18. Hirszfeld, L., Zborowski, H. *Klin. Wschr.* 1926, **5**, 741.
19. Epstein, B., Podvinec, E. *Jb. Kinderheilk.* 1928, **71**, 123.

A COLOURLESS SUBSTITUTE FOR CANADA BALSAM

SIR,—Some years ago [1] you published a letter from me recommending 'Silicone D.C. 804' as a mounting medium. It has important advantages, and is quite successful for pathological sections, but its molecular weight is too high to allow it to penetrate tissues, especially plant cuticles.

A mixture of seven parts of 'Lucite 44' (du Pont de Nemours & Co.) and one part of 'Aroclor 4465' (Monsanto Chemical Corporation) dissolves readily in xylene, giving a stable residue after evaporation, with a refractive index much the same as that of Canada balsam, with no colour whatsoever, and with good adherence to glass. The resin mixture penetrates plant cuticles easily, and it has a very low acid value.

I have to thank my friend Mr. Ed. Frison, of Anvers, for calling my attention to these resins; an article from his pen on their use separately will appear shortly in *The Microscope*. My own contribution has simply been to combine them in suitable proportions to balance the low refractive index of the former against the high one of the latter in such a way as to give a resin equivalent to Canada balsam. Mr. A. G. Palmer, chief laboratory technologist at the General Hospital, Hereford, has very kindly helped me in testing these resins.

Holme Lacy Hospital, Hereford. D. S. SPENCE.

The Editor of the *Medical Directory* writes: "The accuracy of the directory depends on the return of the annual schedule, which has recently been posted to members of the medical profession. Should the schedule have been mislaid I will gladly forward a duplicate upon request. The full name and year of qualification of the doctor should be sent for identification." The directory is published by Messrs. J. & A. Churchill Ltd., 104, Gloucester Place, London, W.1.

Parliament

Medical Tests for National Service

IN the House of Commons on June 27, Mr. NORMAN DODDS complained of anomalies in National Service. It was not his concern whether or not a well-known cricketer was asked to do his two years' National Service, but it was his concern that if that cricketer could be exempted because of his physical limitations, no other man who was as bad or worse in the physical sense should be called up to serve in the Armed Forces. Many young men, he said, who put up fantastic feats of physical endurance did not seem to be well enough to share the burden of compulsory service. He had a long list of boxers, tennis-players, jockeys, racing motorists, cricketers, and footballers who so far had "dodged the column" in a most blatant way. There seemed to be one law for the athletes and another for the not so athletic. An inquiry was necessary to show either that these allegations or insinuations were totally unfounded, or to make changes which would provide a deeper sense of justice and fair play all round, not only among the men who served, but among parents, many of whom felt that their sons were not having a square deal.

Mr. HAROLD WATKINSON, parliamentary secretary to the Ministry of Labour and National Service, said that in the Government's view there was no reason for such an inquiry. It was the determination of the Minister of National Service, the Prime Minister, and all the Service Ministers that National Service should continue to rest on the only possible basis—that it was fair and equally applied between one man and another, whatever his social background. Whether a man was good at tennis, cricket, or football did not enter into it. There was an appeal procedure from the National Service medical boards, and out of 300,000 medical examinations made since the appeal procedure started there had been only 2671 appeals, or 0·8%. Even in those appeals the original grading was confirmed in 42% of the cases—and indeed in 11% the gradings were raised.

1. *Lancet*, 1947, ii, 850.

Though everyone knew that there was this right of appeal, the number of appeals was small, and more than half of the gradings were either confirmed or raised. Jockeys were deferred for training, as he thought they should be. If an apprentice in the engineering industry could get deferment why not a jockey? At the end of two years' training a man was called up if he was found fit for service. The medical requirements of different Services were bound to vary. For example, the medical standard for any pilot in the R.A.F. was different from that of a man in the Royal Army Pay Corps who would do nothing but sedentary home duties. There had been a lot of talk about racing motorists, but the Minister was satisfied that on proper medical grounds the action taken was correct. The medical tests were as accurate as medical science could make them, and there was no differentiation between men who were called up, except on proper medical grounds. For that reason the Government rejected an inquiry as unnecessary.

QUESTION TIME

Possible Recall to National Service

Mr. W. W. HAMILTON asked the Minister of Labour if he would make a statement on the steps taken by his department to keep track of all National Service men discharged on medical grounds to ensure that they were recalled if there had been sufficient recovery from the original physical disability.—Sir WALTER MONCKTON: No such steps are taken, as, in accordance with the policy laid down during the war years by the then Minister of Labour, it has not been the practice to recall for further service those National Service men who are discharged on medical grounds. Mr. HAMILTON: Would it not be reasonable to consider recalling men whose condition, they having been discharged on medical grounds and having had a subsequent operation, has been found to have improved? Is the Minister aware that the impression created in my mind and in the minds of many people is that there has been preferential treatment of a certain person? The only way to remove these doubts is to have this man medically re-examined after the operation which he is to have and, if his condition is found to have sufficiently improved, to recall him.—Sir WALTER MONCKTON: I do not think that it would be very wise just because of one case—even if the hon. gentleman's assumptions were accepted—to alter a practice which has stood for fifteen years.

Pharmaceutical Advisory Committee

Replying to a question, Mr. IAIN MACLEOD, Minister of Health, said that this committee of the Central Health Services Council, together with the standing medical and nursing advisory committees, had been asked for advice about the adoption of a standard system for settling responsibility for the custody and issue of dangerous drugs and scheduled poisons in hospitals, and also for recording the requisitioning and issuing of them. No other questions had been referred to the committee during 1954, and no advice had been received from them.

N.H.S. Convalescent Homes

Replying to a question, Mr. MACLEOD said that the number of convalescent homes in the National Health Service for each region was as follows:

Region	No. of homes at Dec. 31, 1953	Total bed complement	% of convalescent beds to hospital beds (excluding mental and M.D.)	Average weekly cost per patient 1953–54
				£ s. d.
Newcastle.. ..	5	153	0·93	8 16 0
Leeds	11	558	2·9	7 12 11
Sheffield	13	686	3·2	9 0 5
East Anglia ..	4	222	2·6	7 15 11
N.W. Metropolitan	11	518	2·5	8 8 2
N.E. Metropolitan	4	135	0·62	6 18 1
S.E. Metropolitan	15	1125	4·3	6 19 1
S.W. Metropolitan	8	422	1·5	8 0 4
Oxford	6	324	4·1	9 3 8
South Western ..	9	385	2·1	7 5 9
Wales	2	84	0·52	8 4 2
Birmingham ..	6	284	1·1	10 16 2
Manchester ..	8	286	1·1	10 4 10
Liverpool	7	435	2·9	8 15 4

N.H.S. Reciprocal Arrangements

Replying to a question, Mr. MACLEOD gave the following information about foreign countries with which we had reciprocal agreements entitling British subjects to medical treatment:

1. *Multilateral agreements.*—A reciprocal agreement is in force between the United Kingdom, France, Belgium, the Netherlands, and Luxemburg for giving medical treatment to indigent persons. A convention extending this arrangement to all members of the Council of Europe was signed in December, 1953, and is in force between those countries which have ratified it (the United Kingdom, the Irish Republic, the Netherlands, Norway, Denmark, and the Saar).

2. *Bilateral agreements.*—Agreements are in force whereby British subjects employed in France, Italy, the Netherlands, and Luxemburg who participate in the social insurance schemes of those countries can have their United Kingdom insurance taken into account in reckoning their entitlement, and that of their dependants, to medical benefit. Agreements with Austria, Belgium, the German Federal Republic, and Sweden are being negotiated.

War-pensioner Hospitals

Replying to a question, Mr. MACLEOD said that he was satisfied that the time had come to make arrangements for the transfer to the administration of the appropriate regional boards and management committees of two of the war-pensioner hospitals, as had already been done for the war-pensioner units at Taunton, Cosham, and Stoke Mandeville. Administrative responsibility for Dunston Hill Hospital, Gateshead, and for Mount Pleasant Hospital, Chepstow, would be transferred from April 1 next. The special character of these hospitals as centres for war-pensioners would not be changed, and pensioners would continue to receive absolute priority of admission and treatment and the facilities they had enjoyed in the past. The representative war-pensioner organisations would be consulted when making appointments to the hospital management committees and house committees, to ensure adequate ex-Service representation. The necessary steps would be taken to safeguard the interests of all the staff concerned.

Cost of Prescriptions

In answer to a question, Mr. MACLEOD said that the average cost per N.H.S. prescription during September, 1954, was 51*d.* compared with 48·59*d.* in January, 1954.

Poliomyelitis Vaccine

Mr. S. P. VIANT asked the Minister of Health, in view of the fact that an antipoliomyelitis vaccine can now be prepared through eggs to be administered by mouth, if he would cancel his orders for the Salk vaccine, which is prepared from monkey tissue.—Mr. MACLEOD replied: I am advised that the development of an egg vaccine against poliomyelitis is still in the experimental stage. In the circumstances it would be unwise to reject other available vaccines, subject to all proper safety tests.

Registration of Opticians

Replying to a question urging that early steps should be taken to prepare a Bill for the registration of opticians, based on the report of the Crook Committee, Miss PATRICIA HORNSBY-SMITH said the Minister of Health was afraid that legislation on this subject must wait until Parliamentary time was available, and he could not say when that would be.

Mr. WILLIAM GRIFFITHS: Is the hon. lady aware that sales of spectacles in chain stores have been increasing sharply recently and in absolute contrast to what happened in 1948 after the introduction of the National Health Service, when such sales dwindled practically to nil? This matter is causing grave concern among hospital workers.—Miss HORNSBY-SMITH: A large measure of agreement has been reached in discussions with the professional bodies. We have every intention of introducing necessary legislation when Parliamentary time can be found.

Advertisements in Hospitals

Mr. ARTHUR LEWIS asked the Minister if he was aware that appointment cards issued by St. Bartholomew's Hospital to patients contained advertisements for proprietary brands of toothpaste urging the patients to use a particular brand of tootlipaste; and whether he would stop this practice.—Mr. MACLEOD said that he was informed that there had recently been some unauthorised use of appointment cards of this kind in the dental department of the hospital. The board of governors regretted the occurrence and had taken immediate steps to ensure that it would not happen again.

Home Confinements

Replying to a question, Mr. MACLEOD said that the percentage of home confinements in 1954 was 36·4.

Hospital Waiting-lists

Replying to a question, Mr. MACLEOD said that the number of people waiting for admission to hospitals in England and Wales was 470,213 in December, 1954, compared with 503,584 in December, 1951. Of these 2·11% and 1·75% respectively were chronically sick, the overwhelming majority of them being old people.

Medical Services in the Gas Industry

Replying to a question, Mr. GEOFFREY LLOYD, Minister of Fuel and Power, said that 9 of the 12 gas boards how had full-time medical officers and 2 had appointed medical consultants.

Diary of the Week

JULY 10 TO 16

Tuesday, 12th

ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East, S.W.1
5 P.M. Lord Amulree: Modern Hospital Treatment and the Pensioner. (F. E. Williams lecture.)

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, London, W.C.2
5 P.M. Prof. H. Olivecrona (Stockholm): Hypophysectomy. (Moynihan lecture.)

INSTITUTE OF NEUROLOGY, National Hospital, Queen Square, London, W.C.1
5 P.M. Prof. Guido Fanconi (Zürich): Pathomorphosis of Diseases of the Central Nervous System occurring in the Last Fifty Years.

Wednesday, 13th

ASSOCIATION OF CLINICAL BIOCHEMISTS
5.30 P.M. (Westminster Medical School, Horseferry Road, London, S.W.1.) Dr. D. D. Van Slyke: Renal Disease.

Thursday, 14th

INSTITUTE OF LARYNGOLOGY AND OTOLOGY, 330, Gray's Inn Road, London, W.C.1.
6 P.M. Dr. Evelyn Robe (Chicago): Physiology of the Larynx. (Film.)

Friday, 15th

ROYAL COLLEGE OF SURGEONS OF ENGLAND
4 P.M. Prof. A. B. MacGregor: Treatment of Fractures of the Mandibular Condyle. (Charles Tomes lectures.)

BIOCHEMICAL SOCIETY
11 A.M. (University College of North Wales, Bangor.) Scientific papers.

Appointments

BARKER, ROSETTA C., M.B. Belf., D.P.H.: M.O.H., East Retford.

CLARKE, E. E., M.D. N.U.I.: senior asst. psychiatrist, Coppice Hospital, Mapperley, Notts.

COWDELL, R. H., D.M. Oxfd: consultant, department of pathology, Radcliffe Infirmary, Oxford.

FREW, J. S., M.D. Glasg., M.R.C.P.: consultant asst. physician, Dundee Royal Infirmary and Maryfield Hospital.

KNOX, W. A., M.B. Belf., D.P.H.: M.O.H. and school M.O., Cirencester.

SLATER, A. L., M.D. Lond.: asst. M.O., Surrey county council (Guildford).

THOMPSON, R. C. W., M.B. Lond., F.F.A. R.C.S., D.A.: part-time consultant anæsthetist, Charing Cross Hospital, London.

London Transport:

ACRES, G. C., M.R.C.S.: i/c North-East division medical centre at Manor House.

WEEKS, J. L., M.B. Lond.: M.O. at the South-West division medical centre.

United Liverpool Hospitals:

LOUGHREY, J. D., M.R.C.S., F.F.A. R.C.S., D.A.: consultant anæsthetist.

RIDING, J. E., M.B. Lpool, F.F.A. R.C.S., D.A.: consultant anæsthetist.

STEAD, A. L., M.D. St. And., F.F.A. R.C.S., D.A.: consultant anæsthetist.

Births, Marriages, and Deaths

BIRTHS

JONES.—On June 18, at Queen Mary's Hospital, Hong-Kong, to Sheila, wife of Surgeon Lieut.-Commander B. Victor Jones, R.N.—a son.

Notes and News

THE DOCTOR'S SHARE IN HOSPITAL MANAGEMENT

THE Secretary of State for Scotland's Standing Advisory Committee on Hospital and Specialist Services has appointed a subcommittee "To consider how medical participation in the control and management of hospitals can best be secured in Scottish conditions with reference to (*a*) the employment of medical superintendents, their functions, recruitment and training; and (*b*) medical staff committees, their constitution and functions." The members are:

Sir George Henderson (chairman), formerly secretary, Department of Health for Scotland, chairman, board of management, Edinburgh Royal Infirmary; Mr. William Dick, vice-chairman, board of management, West Fife Hospitals; Mr. W. W. Galbraith, F.R.F.P.S., member of the Joint Consultants' Committee (Scotland); Mr. J. F. A. Gibson, C.A., vice-chairman, board of management, Glasgow Royal Mental Hospital; Mr. W. M. Mackinlay, J.P., convener of finance committee, board of management, Glasgow Royal Infirmary; Prof. G. L. Montgomery, F.R.F.P.S., chairman, Scottish Health Services Council; Lady Taylor, M.D., J.P., member of the North-Eastern Regional Hospital Board.

The secretary is Mr. J. B. Hume, Department of Health for Scotland.

TRAINING OF MENTAL NURSES

THE system of training nurses now adopted at Rubery Hill Hospital, Birmingham, was described at the annual public meeting of the hospital on June 22 by Mr. David Rhydderch, chairman of the management committee. Formerly, he said, a nurse had a course of three years entirely devoted to mental nursing, after which she could be sent to a general hospital for two years to complete her general training. In the new (four-year) course the nurse goes to Rubery Hill for the first year and to the general hospital for the second. She sits for the final general certificate at the end of three years, and the final mental certificate at the end of four. "I do not pretend the course is an easy one. It is not. But the student with the proper educational background who is determined to succeed is assured at the end of four years of a well-paid career throughout the whole of the British Commonwealth, since the status conferred on her by the General Nursing Council is an open passport to employment anywhere within the Commonwealth. This fact is often overlooked both by established students and by girls seeking an adventurous career."

USE OF EDINBURGH HEALTH CENTRE

Edinburgh Town Council last week considered a report by the health committee which stated that during the past year clinic attendances at the Sighthill health centre totalled 5194 (*Scotsman*, July 1). The centre, which was opened two years ago (see *Lancet*, 1953, i, 1038), includes accommodation for a child-welfare centre, mothercraft class, and school health and dental clinics, and has a toddlers' playground. For this accommodation and its share of the cost of heating, lighting, and other services the committee pays £6600 per annum. At the meeting Bailie Tom Hunter said that the cost per attendance worked out at £1 5*s*. 5*d*. Mr. James Ross suggested that the health committee might approach the committee of management or, if necessary, the Secretary of State for Scotland, to try to ensure that the services at the centre were fully used; and that representatives from responsible community organisations in the area should be added to the committee of management.

ARTIFICIAL RESPIRATION

GENERAL recognition that the Holger-Nielsen is by far the best method of artificial respiration for general use has meant the rewriting of first-aid manuals. Thus the new one issued by the Irish Red Cross Society[1] is largely devoted to its exposition. That the advantages of this ingenious reconciliation of the seemingly opposed virtues of the Schafer and Silvester methods are genuine and not merely theoretical will be borne out by anyone who has used it or seen it used in practice. Most doctors were brought up on the older methods, and it is important that they should learn the newest method: to put the matter at its lowest, it is not agreeable to have it demonstrated to one in public, after an accident, by a very junior Red Cross amateur. The method is one which can be readily learnt from a book, and this manual provides an entirely sufficient account. In the next edition we should like to see more about the manual Eve's rocking method

1. Manual on Artificial Respiration and Resuscitation. Pp. 20. From the Red Cross Society, 25, Westland Row, Dublin.

for children, which can be used to begin artificial respiration (especially urgent with small bodies) while still standing in water, and the sitting method for use in small boats.

PREVENTING INDUSTRIAL DERMATITIS

Complete Cleansing (16 mm., sound, colour, 15 minutes) is a new film designed to minimise cases of industrial dermatitis by encouraging workers to use barrier creams, protective clothing, washing facilities, and a cleanser to remove oil and grease from their hands.

After an introduction referring to the needless loss of man-hours through dermatitis, diagrams illustrate a section through the skin and the way blockage of the sebaceous ducts by grease can lead to trouble. Cases of dermatitis are shown. A sequence showing the bacteriological investigation of cutting oils follows, and the film ends with the wrong and right ways of cleaning the hands of oil and grease.

The film is very useful for showing to industrial workers, and the diagrammatic sequence is excellent.

University of Birmingham

On July 2 the following degrees were conferred:

M.D.—W. T. Cooke, Brian MacMahon (with honours); H. G. H. Richards.

D.Phil.—* Ishar Dyal Singh, E. A. Smith, A. G. W. Whitfield.

M.B., Ch.B.—Molly Hill (with second-class honours); Jean E. M. Baron, Brenda L. Bodenham, F. S. Boi-Doku, Ann D. Braham, Jeanne L. Brough, G. T. Brown, K. G. Buckler, P. J. Chaudoir, Jay-Gopal Chitnis, A. E. Cutler, Tara Singh Dogra, * Denise J. Duchesne, J. L. Dyke, Elizabeth A. Fisher, Christine M. Fitzgerald, C. B. Franklin, Elizabeth George, J. D. Goode, C. M. Green, Peter Hall, Sheila P. Hancock, Barry Hansell, A. J. Harbott, M. A. Harper, Pamela A. Harris, B. G. Harwin, John Haslam, C. N. Haynes, R. W. Heslop, Margaret W. Hill-Owens, J. R. Holliday, Gabriel Horn, Julia C. Hurford, G. T. Kelley, J. N. Kille, D. G. Larard, J. D. Leng, Leslie Lewis, H. McD. Liegeois, M. B. Love, Mary L. Mackay, R. B. Miller, Valerie E. Millward, Mary G. M. Moss, P. M. Moss, S. H. Nicolaides, G. D. Officer, A. L. Parker, A. W. Parkes, J. L. Pearce, D. C. Pearson, Eric Peters, D. M. Price, B. B. Reid, R. F. Reynolds, M. T. Rigby, R. O. Rimmer, M. L. Rutter, Frank Sayer, Betty V. Scott, R. C. Shapiera, Helen R. Sharples, Roy Summerly, Robert Tinkler, J. A. Tooth, G. J. Varley, D. M. Ward, M. S. Warwick, J. L. Webster, Myrtle E. White, B. N. Williams, M. A. Woodhouse.

* In absentia.

University of Manchester

Mr. K. Bullock, PH.D., F.R.I.C., reader in pharmaceutical chemistry in the university, has been appointed to the chair of pharmacy in succession to Prof. H. Brindle, M.SC., F.R.I.C., who retires in September.

Royal College of Surgeons of England

Moynihan lectures.—On Tuesday, July 12, Prof. H. Olivecrona (Stockholm) will speak on Hypophysectomy; and on Tuesday, July 19, Dr. Frederick Coller (Ann Arbor) will speak on Splenectomy. These lectures will be held at 5 P.M., at the College, Lincoln's Inn Fields, London, W.C.2.

Fellowships in Clinical Research

The Medical Research Council have made the following new appointments to fellowships in clinical research for 1955–56:

Dr. D. A. Davey, medical research fellow, St. Mary's Hospital, London.

Dr. A. H. Gowenlock, resident clinical pathologist, Manchester Royal Infirmary.

Dr. S. H. Taylor, senior house-officer, department of medicine, Queen Elizabeth Hospital, Birmingham.

Ciba Awards

The Ciba Foundation has made the following awards for 1954–55 for research into the problems of ageing:

S. M. Friedman (University of British Columbia) £400; E. M. Hartsook (Pennsylvania State University), M. M. Hoffman (McGill University), J. E. Lovelock (National Institute for Medical Research, London), and H. Sobel (Cedars of Lebanon Hospital, Los Angeles) each £350; W. Hobson (Sheffield University) and E. Geiringer (Glasgow Hospital for Sick Children) each £100.

National Association for the Paralysed

At the annual general meeting of this association on June 23, Lord Kilmaine stressed the continuing importance of voluntary personal service in the Welfare State. He also urged the need for coördination among the voluntary organisations, and suggested that a merging of sectional interests and a greater pooling of resources would do most to further the interests of the disabled themselves. The association's latest annual report records the progress towards the provision of a long-stay hostel and a sheltered workshop with accommodation for the young chronic sick and the growth of its holiday scheme. On July 18 the offices of the association will be moved to 1, York Street, Baker Street, London, W.1.

Medico-Legal Society

Mr. William Latey, Q.C., has been elected president.

Royal Medical Benevolent Fund

The annual general meeting of the Fund is to be held on Thursday, July 28, at 5 P.M., at 11, Chandos Street, W.1. The president, Lord Webb-Johnson, will take the chair.

Middlesex County Medical Society

The John Tate lecture which Dr. Rowland Hill was to have given to this society on Wednesday, July 13, has been postponed.

United Cambridge Hospitals

Mr. R. H. Parker has been appointed chairman of the board of these hospitals in succession to Mr. Thomas Knox-Shaw, who remains a member.

Central Medical School, Fiji

Dr. A. R. Edmonds has been appointed principal and Mr. K. J. Gilchrist lecturer in anatomy and surgery at the school.

International Congress on Criminology

The third international congress is to be held in London from Sept. 12 to 18. The main subject for discussion will be Recidivism. Further details may be had from Mr. H. O. Cox, 28, Weymouth Street, W.1.

American Dermatological Association

The association is offering prizes for original work, not previously published, on some fundamental aspect of dermatology or syphilology. Essays should be sent (not later than Nov. 15), to Dr. J. Lamar Callaway, Duke Hospital, Durham, North Carolina.

VIII International Congress of Paediatrics

This congress will be held next year from July 22 to 27 in Copenhagen under the presidency of Prof. Preben Plum. Further particulars may be had from the secretary of the congress, Domus Medica, 12A, Kristianiagade, Copenhagen Ø, Denmark.

Ernest and Minnie Dawson Cancer Trust

In 1956 this trust will offer two prizes, of £1500 and £500, for essays on cancer: its early diagnosis, causes, prevention, and treatment. The awards will be subject to the merit of the entries. The competition is open to all general medical practitioners in Lancashire or Yorkshire. Further particulars will be found in our advertisement columns.

Appeal to Privy Council

Dr. R. T. N. Simpson has petitioned for an appeal to the medical committee of the Privy Council against the erasure of his name from the Medical Register which was ordered by the medical disciplinary committee of the General Medical Council on May 26 (see *Lancet*, 1955, i, 1172). Dr. Simpson's name will remain on the register pending the appeal.

Doctors' Handwriting

At a meeting of the Northern Ireland General Health Services Board Mr. G. D. Stewart, the secretary, said that the standard of doctors' handwriting on prescriptions had deteriorated. Mr. J. P. Duff, the chairman, said that some time ago doctors who wrote illegibly had been warned that the board would refuse to pay for their prescriptions unless their writing improved; and this had been followed by some improvement. At its latest meeting the board decided to warn twelve of the worst offenders that their writing must improve.

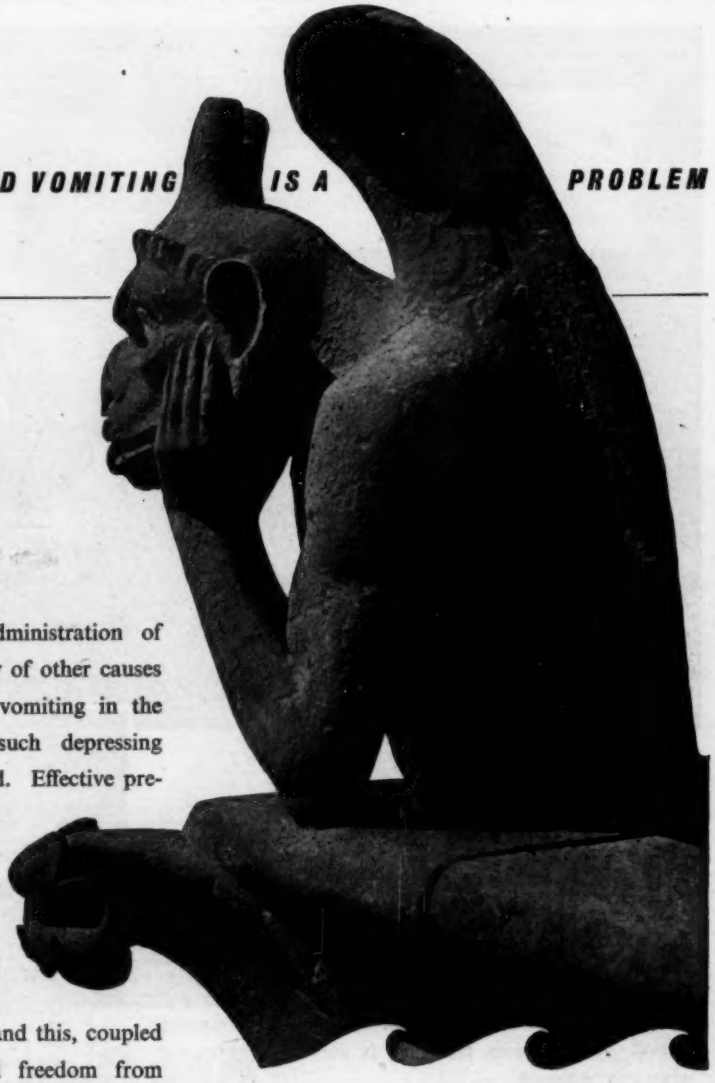
Sickness Benefit

In 1954 new claims for sickness benefit numbered some 7,173,000—the second lowest figure since 1950. The number of current claims reached its peak in mid-February (some 1,100,000), falling steadily to 800,000 in August and rising slowly to 970,000 in December—a little higher than for the same month in earlier years. The cost of sickness benefit in the year ended March 31, 1954, was nearly £85 million. These figures are included in the Report of the Ministry of Pensions and National Insurance for 1954 (Cmd. 9495. H.M. Stationery Office. 4s.).

Dr. Leslie Eddey, until recently chief medical officer to the ministry of health of the Gold Coast, has accepted a two-year appointment from the World Health Organisation to establish a school for the training of health assistants in Katmandu, Nepal.

CORRIGENDUM: *Peroneal Spastic Flat-foot.*—In our annotation on this subject (June 18, p. 1262) the name of Mr. N. J. Blockey was mis-spelt.

WHEN NAUSEA AND VOMITING IS A PROBLEM



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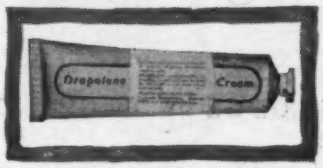

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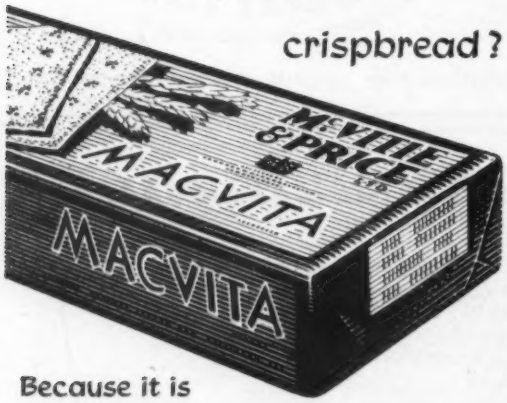

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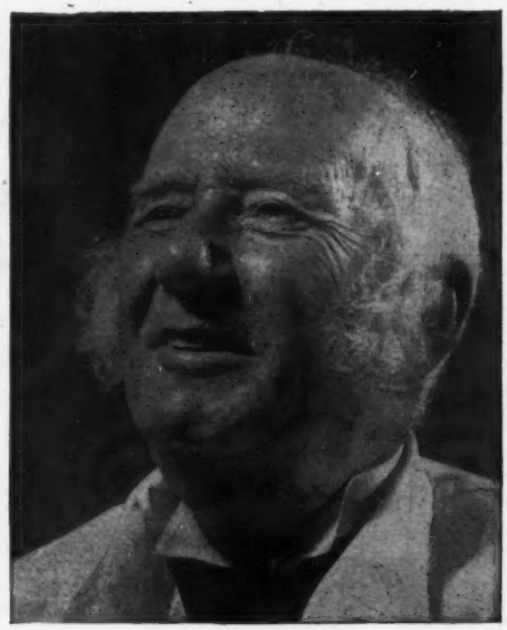

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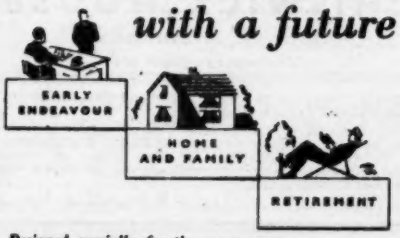

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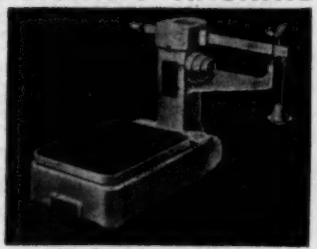

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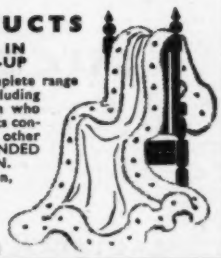

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Academic and Educational

UNIVERSITY OF LONDON

INSTITUTE OF OBSTETRICS AND GYNÆCOLOGY

(Incorporating the teaching facilities of Queen Charlotte's Maternity Hospital, Chelsea Hospital for Women and the Department of Obstetrics and Gynæcology at Hammersmith Hospital.)

Applications are invited from graduates with a registrable qualification for enrolment for the AUTUMN TERM (5TH SEPTEMBER–3RD DECEMBER, 1955). Graduates attend each of the constituent hospitals in turn for clinical work, and attend lectures and special demonstrations at all 3 hospitals. Enrolment fee £3. Tuition fee £36 a term.

General practitioners wishing further experience in obstetrics may be accepted to attend the course at Queen Charlotte's Maternity Hospital for shorter periods—i.e., 2–4 weeks. They will be allowed to do normal deliveries and will have the opportunity of attending the combined classes of lectures and demonstrations at the 3 hospitals of the Institute. Ministry of Health grants are payable to approved general practitioners attending for a period of 2 weeks.

An INTENSIVE COURSE for those preparing for M.D. and M.R.C.O.G. will be held from 5TH DECEMBER to 17TH DECEMBER, 1955.

During the winter vacation, a limited number of graduates may attend the practice of the hospital.

A Refresher Course for General Practitioners will be held from 27th February to 3rd March, 1956.

Hostel accommodation is available at Queen Charlotte's Hospital and at Hammersmith Hospital.

Further particulars can be obtained from the Secretary, Institute of Obstetrics and Gynæcology, Chelsea Hospital for Women, Dovehouse-street, London, S.W.3.

UNIVERSITY OF LONDON

GRANTS FOR RESEARCH

Applications are invited from members * of the University for grants from the Central Research Fund to assist specific projects of research and for the provision of special materials and apparatus. Grants are not made for normal maintenance.

Applications must next be received not later than 31ST AUGUST, 1955. Forms of application and further particulars may be obtained from the Secretary to the Central Research Funds Committee, University of London, Senate House, London, W.C.1.

* Members of the University are defined by Statute as the Chancellor, the members for the time being of the Court and of the Senate respectively, the Professors and Readers and other Teachers of the University during their tenure of office, the graduates and the students.

INSTITUTE OF LARYNGOLOGY AND OTOLOGY

(UNIVERSITY OF LONDON)

330/332, Gray's Inn-road, W.C.1

ADVANCED REVISION COURSE for Final F.R.C.S. students; 8TH AUGUST–22ND OCTOBER, 1955. Arranged as part-time course (mostly evenings) to meet circumstances of students holding appointments. Fee £21.

Detailed syllabus obtainable from the Dean.

MENTAL HEALTH RESEARCH FUND

Applications are invited for 2 LEVERHULME RESEARCH FELLOWSHIPS from suitably qualified and experienced persons wishing to pursue full-time research work bearing on problems of mental health, whether in clinical psychiatry or in one of its supporting sciences. The appointments are for 2–3 years in the first instance, renewable for a maximum of 1 year thereafter. The value of each Fellowship, which has been provided by the Leverhulme Trust, is £2000 p.a. (including superannuation).

Further information from the Hon. Secretary, Mental Health Research Fund, 39, Queen Anne-street, London, W.1.

THE ERNEST AND MINNIE DAWSON CANCER TRUST

A COMPETITION FOR GENERAL MEDICAL PRACTITIONERS

PRELIMINARY NOTICE

Under the provisions of the Trust Deed of the Ernest and Minnie Dawson Cancer Trust a competition will take place in 1956 and will be in the form of a thesis on the following general subject :—

"Cancer : its early diagnosis, causes, prevention and treatment."

The competition will be open to all general medical practitioners practising and/or residing in Lancashire or Yorkshire; and the prizes offered are £1500 (first) and £500 (second), subject to the merit of the entries submitted.

Further details and conditions of entry will be announced later, or may be obtained from the Clerk to the Trust, The Ernest and Minnie Dawson Cancer Trust, 89A, Fishergate-hill, Preston, Lancs. E. PEARSON, Clerk to the Trust.

A SYMPOSIUM ON THE MODERN ASPECTS OF RENAL DISEASE

will be held at

The Postgraduate Medical School, Ducane-road, London

from 26TH to 30TH SEPTEMBER, 1955

The programme will consist of Lectures, Demonstrations of biochemical, pathological, and radiological techniques, presentation of cases, and question and answer discussions. It is limited to a maximum of 40 and will be designed for Consultants wishing to study recent advances in the diagnosis and management of renal diseases.

Registration fee only (3 guineas) for incidental and social expenses.

Apply by 2nd September for further information and places to the Dean, Postgraduate Medical School, Ducane-road, London, W.12.

THE UNIVERSITY and the ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW

POSTGRADUATE MEDICAL EDUCATION COMMITTEE

PRIMARY EXAMINATION FOR THE SURGICAL FELLOWSHIPS

A COURSE OF INSTRUCTION in Anatomy, Physiology, Biochemistry, Pathology and Bacteriology suitable for candidates preparing for the Primary examination of the Fellowship *qua* Surgeon of the Royal Faculty of Physicians and Surgeons of Glasgow will be held from 10TH OCTOBER to 2ND DECEMBER, 1955. (The Primary examination conducted by the Glasgow Royal Faculty is accepted by the Royal Colleges of Surgeons of Edinburgh, of England, and in Ireland in lieu of the corresponding examinations of these Bodies.) The Course will comprise a total of approximately 160 hours instruction given daily from MONDAYS to FRIDAYS, between the hours of NOON and 5.30 P.M. The course will be open to junior staff of hospitals in the Western Region of Scotland and also to other suitable applicants. Applicants not employed in the hospitals of the Western Region will, so far as can be arranged, be given an honorary clinical attachment to one of the surgical teaching units. The fee for the course is 25 guineas.

COURSE IN CHEMOTHERAPY FOR GENERAL PRACTITIONERS

A short intensive Course on the Principles and Application of Chemotherapy in Acute and Chronic Infectious Diseases will be held at Ruchill Hospital, Glasgow, from MONDAY, 3RD OCTOBER, to SATURDAY, 8TH OCTOBER, 1955. The course will comprise : (1) Systematic lectures followed by appropriate clinical demonstrations on the different infectious diseases, including pneumonia and tuberculosis. (2) Lectures and demonstrations on the scope and effective application of all forms of chemotherapy. (3) Practical demonstrations of the techniques used in the diagnosis and control of infectious disease. The fee for the Course is 5 guineas.

COURSE IN MENTAL DEFICIENCY

A short intensive postgraduate Course in Mental Deficiency will be held from 10TH OCTOBER to 28TH OCTOBER, 1955. The course will comprise : (*a*) Lectures and demonstrations in various aspects of mental handicap and mental deficiency ; (*b*) instruction in mental testing ; (*c*) visits to institutions. Fee : 15 guineas. The course will be limited to 20 practitioners, places being allocated in order of return of application forms.

Those wishing to attend any of these Courses should make early application to the Director of Postgraduate Medical Education, The University, Glasgow, W.2, from whom further details and a syllabus may be obtained

UNIVERSITY OF GLASGOW

RESEARCH ASSISTANTSHIP IN VIRUS DISEASES

A Science graduate assistant is required for research involving tissue culture of viruses. Previous experience is not essential. The salary, which will be paid from a grant available for 3 years, will be within the range £410–£25–£765.

Applications (6 copies), with full details of qualifications and experience, and the names of 2 referees, should be sent, not later than 25th July, 1955, to the Secretary of the University Court, The University, Glasgow, W.2, from whom further particulars may be obtained.

ROBT. T. HUTCHESON, Secretary of University Court.

WILL EDMONDS CLINICAL RESEARCH FUND

Applications are invited from registered medical practitioners for a FELLOWSHIP at an initial salary at the rate of £1250 a year, to be awarded for clinical research in hospitals in the Metropolitan area of London. The appointment will be made for a year in the first instance but the holder will be eligible for reappointment annually up to a total period of 3 years, with salary increments at the rate of £100 a year. The subject of the research must be approved by the Will Edmonds Clinical Research Fund Committee. The appointment will be on a full-time basis. The applicant should state qualifications, the line of research proposed and the hospital at which the work will be done.

Further details may be obtained from the Assistant Secretary, The Royal College of Physicians, Pall Mall East, London, S.W.1, by whom applications for the Fellowship, accompanied by the names of 2 referees, must be received not later than 30th September, 1955.

INSTITUTE OF LARYNGOLOGY AND OTOLOGY

(UNIVERSITY OF LONDON), 330/332, Gray's Inn-road, W.C.1. LECTURER IN PATHOLOGY. Applications are invited for a post of Lecturer in the Department of Pathology and Bacteriology. The duties will include assistance in the general work of the Department (including the teaching of postgraduate students) and in various research projects. The successful candidate will be encouraged and given the necessary facilities to continue or to commence original work connected with this specialty, and opportunity to prepare for higher qualifications. The Lecturer will be given honorary rank as a Senior Registrar by the associated Royal National Throat, Nose, and Ear Hospital. Salary according to the revised University scales—£1000–£100–£1300, plus family allowances where applicable with superannuation provision.

Applications, with the names of 2 referees, should be sent to the Secretary, from whom further information can be obtained, not later than 5th August, 1955.

UNIVERSITY OF EDINBURGH. Department of Therapeutics. Applications are invited for a LECTURESHIP IN THERAPEUTICS. Salary scale £1200–£100–£1600 p.a., with superannuation benefit and family allowance where applicable. The successful candidate will be expected to take up duty on 1st October, 1955, or as soon thereafter as possible.

Further particulars may be obtained from the undersigned, with whom applications (6 copies), together with the names of 2 referees, should be lodged not later than 30th July, 1955.

CHARLES H. STEWART, Secretary to the University.

L.M.S.S.A.

FINAL EXAMINATION: SURGERY, 8th August, 10th October, 14th November, 1955. MEDICINE, PATHOLOGY, 15th August, 17th October, 21st November, 1955. MIDWIFERY, 16th August, 18th October, 22nd November, 1955. MASTERY OF MIDWIFERY, May and November. DIPLOMA IN INDUSTRIAL HEALTH, July and December.

For regulations apply REGISTRAR, Apothecaries' Hall, Black Friars-lane, London, E.C.4.

UNIVERSITY OF DURHAM. King's College, Newcastle UPON TYNE. The Council of King's College invite applications for the post of LECTURER IN PHYSIOLOGY. Applicants should be medically qualified. The Lecturer's main responsibility will be in the teaching of medical students. The appointment is on the Lecturers scale and the salary will rise by annual increments of £100 to a maximum of £1450. The commencing salary of the successful applicant will be fixed at a point on the scale in accordance with his qualifications and experience.

Applications (12 copies), together with the names of 3 persons to whom reference may be made, should be submitted not later than 30th July, 1955, to the undersigned, from whom further particulars may be obtained.

G. R. HANSON, Registrar of King's College.

THE WELSH NATIONAL SCHOOL OF MEDICINE. (UNIVERSITY OF WALES.) Applications are invited for the appointment of RESEARCH ASSISTANT IN STATISTICS in the Department of Preventive Medicine. Applicants should have a University Degree. A medical qualification is not necessary. The appointment is full-time and the salary scale will be that for Lecturers (non-medical) viz. £650–£1350 p.a., the point of entry depending on qualifications and experience. Superannuation and child allowance schemes apply to the appointment.

Further particulars can be obtained from the undersigned, by whom application should be received within 14 days of the appearance of this advertisement.

F. DODSWORTH, Secretary.

34, Newport-road, Cardiff, 30th June, 1955.

INSTITUTE OF MEDICAL AND VETERINARY SCIENCE, SOUTH AUSTRALIA. MEDICAL RESEARCH OFFICER (virology). There is a vacancy for a medical graduate in the Virology Research Division at this Institute. The appointment is for whole-time research on virus diseases of man under the direction of the Medical Research Fellow. The laboratories have all the facilities necessary for this purpose and access to a wide range of material for study. The appointment is for 3 years and the salary £1750 (Australian) with annual increments of £50. The passage to Australia for a successful candidate from Great Britain will be paid.

Further particulars may be obtained from the Director of the Institute (P.O. Box 14, Rundle-street, Adelaide, South Australia). Applications will be received up to 15th September, 1955.

ST. VINCENT'S HOSPITAL CLINICAL SCHOOL. UNIVERSITY OF MELBOURNE. Applications are called for the position of the JOHN HOLT DIRECTOR OF BIOCHEMICAL RESEARCH in the St. Vincent's Hospital School of Medical Research. The successful applicant will be in full charge of the Biochemical Research work but would merely have supervisory control over the hospital's routine Biochemical Department. The research laboratories have been newly built and occupy approximately 4500 square feet. Adequate funds are available for equipment. Initially the department staff will comprise the Director, 2 Assistant Biochemists and 2 Technicians. The assistant staff will be appointed on the advice of the Director. Study leave will be granted after a period of 5 years service. A limited amount of money for the attendance at important scientific meetings will be available. Salary is £3000 a year Australian currency; superannuation according to F.S.S.U. Reasonable travelling expenses to Melbourne will be paid for successful applicant and family. Assistance will be given in finding suitable accommodation. Further details and plans of the laboratories may be seen at the office of the Secretary of the Association of the Universities of the British Commonwealth, Gordon-square, London, W.C.1, or at St. Vincent's Hospital.

Closing date for applications 20th August. Arrangements will be made to interview selected overseas applicants in London between 23rd and 30th August.

E. W. R. GRACE, Chief Executive Officer and Secretary.

UNIVERSITY OF SYDNEY, Australia. The Senate will shortly proceed to an appointment to the CHAIR OF PSYCHIATRY. The Professor will act as Consultant to the clinical services of the mental hospitals controlled by the New South Wales Department of Public Health and will be appointed Medical Director of Broughton Hall Psychiatric Clinic, Sydney. As Medical Director, he will be responsible for the direction and selection of admissions and the entire medical treatment programme at the Clinic. The University will establish a University Department of Psychiatry at the Clinic. The combined salary of the appointee will be £A5000 p.a., to which will apply the retirement provisions of the Professorial Superannuation Scheme. In addition, there will be a pension of not less than £A400 p.a upon retirement after the age of 60 years. Finance is available for home purchase under the Staff Members' Housing Scheme. The Senate reserves the right to fill the Chair by invitation.

Further particulars and information as to the method of application may be obtained from the Secretary, Association of Universities of the British Commonwealth, 36, Gordon-square, London, W.C.1. The closing date for the receipt of applications, in Australia and London, is 15th August, 1955.

Hospital Services: Senior Appointments

CHELMSFORD. ST. JOHN'S HOSPITAL. Locum Tenens SENIOR HOSPITAL MEDICAL OFFICER in Surgery required to work at above Hospital for period 27th August–10th September.

Applications to the Secretary, Chelmsford Hospital Management Committee, London-road, Chelmsford.

GUY'S HOSPITAL, S.E.1. The Board of Governors invite applications for the appointment of DIRECTOR of the Department of Clinical Pathology. The appointment is of Consultant status in the National Health Service and will be on a maximum part-time sessional basis. Applicants are required to hold higher qualifications.

Applications (1 copy), together with the names of 3 referees, should be submitted to reach the Superintendent, Guy's Hospital, London, S.E.1, not later than 16th July, 1955. In accordance with Statutory Instrument No. 1259 of the National Health Service regulations, canvassing members of the Board or Advisory Appointments Committee will lead to disqualification.

NORTH WEST METROPOLITAN REGIONAL HOS-PITAL BOARD.

(1) SENIOR CASUALTY OFFICER (whole-time), Bedford General Hospital (437 Beds) to organise the work of the Casualty Department and to assist in the Orthopædic and Fracture Department, subject to the general supervision of the Senior Surgeons. Higher qualification in surgery desirable. Tenure of post not exceeding 4 years. Salary within the scale £1500 (unless below age 32)–£50–£1950.

Applications by 8th August, 1955.

(2) ASSISTANT RADIOLOGIST (whole-time), Consultant grade, Central Middlesex Hospital, Acton-lane, N.W.10 (726 Beds).

Applications by 15th August, 1955.

Hospitals may be visited by direct appointment.

Application forms obtainable from, and returnable to, Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1.

BIRMINGHAM REGIONAL HOSPITAL BOARD.

(1) **Selly Oak Hospital, Birmingham, 29** (556 chronic sick beds)

Whole-time CONSULTANT GERONTOLOGIST. Experience specialty essential.

(2) **South Worcestershire Group**

Part-time CONSULTANT OBSTETRICIAN GYNÆCOLOGIST (5 notional half-days weekly). Duties at Ronkswood Hospital (4 notional half-days), Worcester Royal Infirmary (1 notional half-day), experience specialty/higher qualification essential.

Applications (15 copies), stating name, age, nationality, qualifications, present and previous appointments, details of 3 referees, to Secretary, Regional Hospital Board, 10, Augustus-road, Birmingham, 15, before 25th July, 1955. Candidates may visit Hospital.

CRICHTON ROYAL MENTAL HOSPITAL. Applications are invited for the post of CLINICAL PSYCHOLOGIST at above Hospital. A good Honours Degree in Psychology is required, but previous clinical experience is not expected. Salary in accordance with Whitley scales for the National Health Service.

Applications should be addressed in the first instance to JOHN C. RAVEN, M.SC., Crichton Royal Department of Psychological Research, 20, Castle-street, Dumfries.

EAST ANGLIAN REGIONAL HOSPITAL BOARD.

(1) CONSULTANT PHYSICIAN (whole-time) in Geriatrics, Norfolk and Norwich area. Higher qualifications, good experience in general medicine and special experience in geriatrics essential. The successful candidate will be required to play a major part in the organisation and further development of treatment and rehabilitation services for the chronic sick, undertake domiciliary consultations and maintain effective liaison with general practitioners and the health and welfare services of local authorities. Candidates invited to visit hospitals concerned by direct arrangement with Hospital Management Committee Secretary, Norfolk and Norwich Hospital.

(2) (*a*) CONSULTANT SURGEON (8 notional half-days). Norwich and Norfolk Hospital Group. Main Hospital Norfolk and Norwich.

(*b*) CONSULTANT SURGEON (maximum part-time). Ipswich and East Suffolk Hospital Group. Main Hospital Ipswich and East Suffolk.

Candidates submitting applications for both posts should indicate any preference.

Candidates invited to visit hospitals by direct arrangement with Hospital Management Committee Secretary: (*a*) Norfolk and Norwich Hospital, and (*b*) Ipswich and East Suffolk Hospital (Anglesea Road Wing).

Applications (8 copies for 1, and 10 copies for 2 (*a*) and (*b*)), stating age, experience and names of 3 referees, to Secretary of Board, 117, Chesterton-road, Cambridge, by 25th July, 1955.

MANCHESTER REGIONAL HOSPITAL BOARD.

(*a*) Whole-time CONSULTANT PHYSICIAN (geriatrics) to the Ashton, Hyde and Glossop Hospital Centre, mainly at Ashton-under-Lyne General Hospital. Good experience in general medicine, special interest and experience in the treatment and rehabilitation of the chronic sick and higher qualifications essential. Appointee required to undertake the domiciliary investigation of patients and establish close liaison with general practitioners and local health authorities. 25th July, 1955.

(*b*) Additional maximum Part-time CONSULTANT ANÆSTHETIST, Preston and Chorley Hospital Centre (Preston Royal Infirmary, Sharoe Green and Chorley Hospitals, &c.) and Whittingham (Mental) Hospital, near Preston. Wide experience, especially in anæsthesia for neurosurgery, essential; appointee to live in or near Preston. 27th July, 1955.

(*c*) Additional Whole-time or maximum Part-time CONSULTANT RADIOLOGIST, Preston and Chorley Hospital Centre (Preston Royal Infirmary, Sharoe Green and Chorley Hospitals, &c.) and Whittingham (Mental) Hospital, near Preston. Good training, higher qualifications and experience in neuroradiology essential; appointee to live in or near Preston. 29th July, 1955.

Application forms from the Senior Administrative Medical Officer to the Board, Cheetwood-road, Manchester, 8, to be returned by dates stated.

MANCHESTER REGIONAL HOSPITAL BOARD. Whole-time NON-RESIDENT ASSISTANT OPHTHALMOLOGIST (Senior Hospital Medical Officer) to the Ophthalmic Department, Victoria Hospital, Burnley, and associated School Eye Clinics in Burnley C.B. and Lancashire C.C. areas. About 4 sessions hospital and 7 sessions clinic work each week.

Application forms from the Senior Administrative Medical Officer to the Board, Cheetwood-road, Manchester, 8, to be returned by 25th July, 1955.

EXETER CLINICAL AREA. South-Western Regional HOSPITAL BOARD. Applications are invited from registered medical practitioners for the appointment of LOCUM TENENS, either Consultant or Senior Hospital Medical Officer, in the Department of Obstetrics and Gynæcology based on Torbay Hospital, Torquay, for the period 1st–28th August, 1955. Own car will be necessary.

Applications, stating age, qualifications and experience, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8.

OXFORD REGIONAL HOSPITAL BOARD. Consultant in Obstetrics and Gynæcology (part-time) for 6 sessions a week to the hospitals of Banbury and District Hospital Management Committee, will be required to live in or near Banbury. Applicants must hold the M.R.C.O.G. and a higher surgical qualification is desirable. The hospitals may be visited by arrangement with the Hospital Management Committee Secretary.

Applications (10 copies) must be submitted by 6th August to the Secretary, Oxford Regional Hospital Board, 43, Banbury-road, Oxford, from whom further details may be obtained.

OXFORD REGIONAL HOSPITAL BOARD. Consultant PSYCHIATRIST (whole-time or maximum part-time) as Deputy Physician Superintendent to St. Crispin Hospital, Duston, Northampton (1220 Beds). Duties will include attendances at the local Child Guidance Clinics. Candidates must hold the D.P.M. and preferably a higher medical qualification. The Hospital may be visited by arrangement with the Physician-Superintendent. House available in close proximity to Hospital at reasonable rental.

Applications (10 copies), with names of 3 referees, to reach the Secretary, Oxford Regional Hospital Board, 43, Banbury-road, Oxford, by 6th August, from whom further information may be obtained.

SCOTLAND. NORTHERN REGIONAL HOSPITAL BOARD. Applications are invited for the whole-time post of ASSISTANT ANÆSTHETIST based on the Inverness Hospitals. Salary scale is £1500 (unless below age 32)–£50–£1950 p.a. Candidates should have a higher qualification in anæsthetics.

Schedules of application may be obtained from the undersigned, with whom applications should be lodged by 23rd July, 1955.

A. M. FRASER, M.D.,
Secretary and Administrative Medical Officer.
Office of the Northern Regional Hospital Board,
Raigmore, Inverness.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of Whole-time ASSISTANT PSYCHIATRIST based at Glengall Mental Hospital, Ayr. Salary (at age 32 and over) on the scale £1500–£50–£1950. This appointment is subject to the National Health Service (Scotland) superannuation regulations.

Applications (16 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, not later than 30 days after the publication of this advertisement.

SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time SENIOR ASSISTANT PSYCHIATRIST required for Bracebridge Heath Hospital, Lincoln. Salary scale £1500–£50–£1950. Self-contained flat available.

Application forms and further details from Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield. Forms to be returned by 29th July, 1955.

SOUTH EAST METROPOLITAN REGIONAL HOS-PITAL BOARD. Applications are invited to fill a vacancy for a CONSULTANT ANÆSTHETIST (part-time 9 notional half-days a week) at the Orpington and Sevenoaks Group of hospitals. Candidates must have had wide experience in anæsthetics and hold the qualification of D.A. or F.F.A.R.C.S. Applicants may visit the hospitals concerned.

Apply, stating nationality, age, sex, qualifications and experience, including details of present appointment and of war service, together with the names and addresses of 3 referees, to the Secretary, Advisory Appointments Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 23rd July, 1955.

SOUTH EAST METROPOLITAN REGIONAL HOS-PITAL BOARD. Applications are invited for an appointment as Part-time ASSISTANT PSYCHIATRIST to undertake 4 notional half-days a week for child guidance work at the Chislehurst Child Guidance Clinic, Red Hill Primary School, Chislehurst, Kent, which is administered by the Kent County Council. Previous experience of child guidance is essential and possession of a higher qualification is desirable. Salary within the scale £1500–£50–£1950. Applicants may visit the Clinic.

Apply, stating nationality, age, sex, qualifications and experience, including details of present appointment and of war service, together with the names and addresses of 3 referees, to the Secretary, Advisory Appointments Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, by 23rd July, 1955.

CANADA. THE CANCER RELIEF AND RESEARCH INSTITUTE, WINNIPEG, MANITOBA, requires ASSISTANT RADIOTHERAPIST for recently established Radiation Therapy Centre housing modern X-ray machines, including a Cobalt[60] Unit. Remuneration commencing at $8700 for candidate with diploma.

Applications, stating age, qualifications, and experience, should be submitted to the Medical Director prior to 15th August.

SOUTH WEST METROPOLITAN REGIONAL HOS-PITAL BOARD requires Locum Tenens PÆDIATRICIAN for 8 sessions weekly for the Bournemouth and East Dorset Group of hospitals for 3 weeks commencing 23rd July. Salary in accordance with the terms and conditions of service of hospital medical staff.

Applications, with names of 2 referees, to Area Secretary, South West Metropolitan Regional Hospital Board, Highcroft, Romsey-road, Winchester, by 16th July, 1955.

Hospital Services : Junior Appointments

BETHNAL GREEN HOSPITAL, Cambridge Heath-road, London, E.2. (General—309 Beds.) Applications are invited for the posts of 2 HOUSE PHYSICIANS (recognised pre-registration posts).

Applications, stating age, qualifications, nationality, and experience, with copies of 2 recent testimonials, to the Hospital Secretary as soon as possible.

CHARING CROSS HOSPITAL. Full-time Senior REGISTRAR in Anæsthesia. Non-resident except on every third week-end. Tenable from 1st September, 1955, for 1 year in the first instance. Candidates should hold the Diploma in Anæsthetics and preferably the F.F.A.R.C.S.

Applications, on forms obtainable from the undersigned, should be returned by 18th July, 1955.

FRANK HART,
House Governor and Secretary to the Board.

CENTRAL MIDDLESEX HOSPITAL, Park Royal, N.W.10. RESIDENT HOUSE OFFICER in Surgical Department. Appointment for 6 months from 1st September, 1955. Pre-registration candidates will be considered.

Applications, with copies of 2 testimonials, to Medical Director by 16th July, 1955.

COLINDALE HOSPITAL, Colindale-avenue, London, N.W.9. (300 Beds.) NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. MEDICAL REGISTRAR (whole-time), resident or non-resident, required at above Hospital for pulmonary and orthopædic tuberculous patients and with a Non-tuberculous Observation Unit. Hospital may be visited by direct appointment with Physician-Superintendent.

Application forms obtainable from, and returnable to, Group Secretary, Hendon Group Hospital Management Committee, Edgware General Hospital, Edgware, Middlesex, by 16th July, 1955.

ELIZABETH GARRETT ANDERSON HOSPITAL, Euston-road, N.W.1. (ROYAL FREE HOSPITAL GROUP.) Applications are invited from pre-registration and registered Women medical practitioners for the post of OBSTETRIC HOUSE SURGEON (recognised for the M.R.C.O.G.). Duties to commence 1st September, 1955. Appointment for 6 months. Salary in accordance with Ministry of Health scale for House Officers.

Applications, with copies of 3 recent testimonials, to be sent to the Secretary, Elizabeth Garrett Anderson Hospital, by 11th July, 1955.

GERMAN HOSPITAL, London, E.9. (General—157 Beds.) Applications are invited from registered medical practitioners for the 6 months appointment of HOUSE SURGEON (obstetric and gynæcology) vacant 8th August, and should be sent to the Group Secretary, Hackney Hospital, E.9, quoting GH HSO.

HACKNEY HOSPITAL, London, E.9. (General—844 Beds.) OBSTETRIC HOUSE SURGEONS required, as under :—

(*a*) From 17th August (pre-registration).
(*b*) From 1st October (not pre-registration).

Posts recognised for M.R.C.O.G.

Apply Secretary, above address, by 23rd July.

HAMMERSMITH HOSPITAL AND POSTGRADUATE MEDICAL SCHOOL, Ducane-road, London, W.12. Applications invited from Senior Registrars who have completed their training for the post of Supernumerary SENIOR REGISTRAR in the Radiodiagnostic Department.

Applications, stating age, qualifications, experience, names of 2 referees, to Secretary, Board of Governors, by 18th July.

HAMPSTEAD GENERAL HOSPITAL. (The Royal Free HOSPITAL GROUP.) Applications from registered medical practitioners (Men or Women) are invited for the post of Whole-time NON-RESIDENT SENIOR REGISTRAR in Clinical Pathology at the Hampstead General Hospital. Appointment for 1 year in the first instance, from 1st September, 1955. Experience in clinical pathology is essential, and in addition special training in biochemistry would be an advantage.

Formal application, stating age, qualification and experience, together with the names of 3 referees, should be sent to the Secretary, the Hampstead General Hospital, Haverstock Hill, N.W.3, not later than 22nd July, 1955.

HIGHLANDS GENERAL HOSPITAL, Winchmore Hill, London, N.21. ORTHOPÆDIC HOUSE SURGEON required, vacant 28th July, 41 orthopædic beds, new Operating Theatre, Outpatient and Casualty Departments.

Applications, with copies of 3 testimonials, to Hospital Secretary.

HIGHLANDS GENERAL HOSPITAL, Winchmore Hill, London, N.21. HOUSE SURGEON, vacant 28th July, 1955, 50 surgical beds, new Operating Theatre, Outpatient and Casualty Departments. Preference given to applicants seeking pre-registration post under Medical Act, 1950.

Applications, with copies of 3 testimonials, to Hospital Secretary.

MOTHERS' HOSPITAL (Salvation Army), London, E.5. (Maternity—110 Beds.) Applications are invited from registered medical practitioners for the 6 months appointment, vacant 1st August, of RESIDENT OBSTETRIC HOUSE SURGEON (post recognised for M.R.C.O.G.).

Apply, with full details, to Group Secretary, Hackney Hospital, London, E.9.

LAMBETH HOSPITAL, Brook-drive, S.E.11. Applications are invited from pre-registration and registered medical practitioners for posts of HOUSE SURGEON (2) falling vacant on 8th and 11th August, 1955. Appointments are for 6 months, recognised for the F.R.C.S.

Application forms from the Physician-Superintendent.

LANGTHORNE HOSPITAL, London, E.11. Leytonstone (NO. 10) HOSPITAL GROUP. Applications are invited for the post of HOUSE OFFICER in the Group Geriatric Unit at above Hospital, which falls vacant on 26th August, 1955. The post offers excellent scope for persons interested in this specialty as the most modern methods of geriatric treatment are employed, supervised by a Consultant Geriatrician, with full consultant services in other branches.

Application forms from the Senior Medical Officer, Langthorne Hospital, London, E.11, to be returned by not later than 21st July, 1955.

MEMORIAL HOSPITAL, Shooters Hill, Woolwich, S.E.18. HOUSE SURGEON, vacant 16th July. Recognised for F.R.C.S. Approved for Pre-registration Service.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

MEMORIAL HOSPITAL, Shooters Hill, Woolwich, S.E.18. HOUSE SURGEON (gynæcology and obstetrics), vacant now. Recognised for M.R.C.O.G. for Gynæcology. Small Obstetric Unit, 20 Beds.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

NORTH LONDON BLOOD TRANSFUSION CENTRE, Deansbrook-road, EDGWARE. JUNIOR HOSPITAL MEDICAL OFFICER for full-time duties with mobile teams at donor sessions. Opportunity for training in clinical pathology exists.

Applications, giving age, qualifications, experience, and names of 2 referees, to Director not later than 2nd August, 1955.

PLAISTOW HOSPITAL, Samson-street, London, E.13. (185 Beds.) Applications are invited for the appointment of RESIDENT HOUSE PHYSICIAN (pre-registration second post) for 6 months commencing early August in the Chest Unit and Infectious Diseases Unit at this Hospital. The position offers valuable experience in both groups of diseases and is particularly useful to candidates sitting for the M.R.C.P. examination.

Applications to M. J. HUNTLEY, Group Secretary, West Ham Group Hospital Management Committee, Stratford, London, E.15, by 20th July, 1955.

PLAISTOW MATERNITY HOSPITAL, Howards-road, Plaistow, London, E.13. RESIDENT OBSTETRIC OFFICER (House Officer post-registration) required for 6 months commencing 1st October, 1955. The post is recognised for D.Obst.R.C.O.G.

Apply by 16th July, to Group Secretary, West Ham Group Hospital Management Committee, Stratford, E.15, enclosing copies of 2 recent testimonials.

QUEEN ELIZABETH HOSPITAL FOR CHILDREN MANAGEMENT COMMITTEE, Hackney-road, E.2, Shadwell, E.1, and BANSTEAD WOOD, SURREY. HOUSE OFFICER. Appointment will be made for 2 consecutive periods of 6 months commencing at Shadwell, 1st September, 1955. First period as House Physician and second as House Surgeon and Casualty Officer.

Application forms may be obtained from the Secretary at Hackney-road and should be returned, with copies of not more than 3 testimonials, on or before 23rd July, 1955.

QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford, London, E.15. HOUSE SURGEON (Male or Female; pre-registration post) required for 6 months commencing 11th August, 1955.

Applications, with copies of recent testimonials, to Group Secretary, West Ham Group Hospital Management Committee, Stratford, E.15, by 16th July, 1955.

QUEEN MARY'S (ROEHAMPTON) HOSPITAL, London, S.W.15. (532 Beds.) REGISTRAR in Pathology required for whole-time duty. National Health Service terms and conditions of service.

Detailed applications (9 copies), giving nationality, date of birth, qualifications and experience, including present appointments and the names of 3 referees, should reach Ministry of Health, Hospital Management Branch, Norcross, Blackpool, Lancashire, by 30th July, 1955.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as Whole-time REGISTRAR in General Medicine to fill a vacancy in the approved trainee establishment at the Lewisham Group of hospitals. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications, and experience with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, London, W.1, not later than 23rd July, 1955.

ST. BARTHOLOMEW'S HOSPITAL, E.C.1. Applications are invited for the post of SENIOR REGISTRAR in the Orthopædic Department for a period of 3 years from 1st October, 1955, subject to annual re-election.

Applications, together with the names of 3 referees, should be submitted to the undersigned not later than 24th July, 1955. C. C. CARUS-WILSON, Clerk to the Governors.

ST. MARY'S HOSPITAL FOR WOMEN AND CHILDREN, Upper-road, Plaistow, London, E.13. HOUSE SURGEON (pre-registration) required.

Apply to Group Secretary, West Ham Group Hospital Management Committee, Stratford, E.15, by 16th July, 1955.

ST. MARK'S HOSPITAL, City-road, London, E.C.1. Part-time HONORARY CLINICAL ASSISTANTS required Monday and Thursday afternoons.

Details obtainable from Secretary.

ST. JOHN'S HOSPITAL, St. John's Hill, S.W.11. Senior HOUSE OFFICER, vacant 1st September. Duties mainly in Geriatric Department, with some orthopædic work. Post offers excellent experience in these 2 fields. Particularly suitable for one working for higher qualifications.

Apply Medical Superintendent, with copies of 2 recent testimonials.

ST. LEONARD'S HOSPITAL, Nuttall-street, London, N.1. (192 Beds.) Applications are invited for the post of RESIDENT ANÆSTHETIST (Senior House Officer) with additional duties in the Group. The post is recognised for the D.A. Good opportunities will be given to study for higher qualifications.

Applications, with 2 recent testimonials, to the Hospital Secretary by 16th July, 1955.

ST. PETER'S, ST. PAUL'S AND ST. PHILIP'S HOSPITALS. RESIDENT SURGICAL OFFICER (Senior Registrar grade) required for St. Peter's Hospital on 1st October, 1955. Applications invited from Male candidates on the British Register who have completed their training in general surgery. Appointment for 6 months, with opportunity for a further 6 months if recommended. Candidates should be prepared to spend 1 year at the Hospital if required.

Applications (12 copies), with 12 copies of 3 recent testimonials, should reach the House Governor, St. Peter's Hospital, Henrietta-street, W.C.2, by 6th August, 1955.

ST. THOMAS'S HOSPITAL, London, S.E.1. Senior REGISTRAR to the Department of Anæsthetics required for a period of 1 year in the first instance.

Applications, including names and addresses of 2 referees, to the Clerk of the Governors by 23rd July, 1955.

ST. THOMAS'S HOSPITAL, London, S.E.1. Resident REGISTRAR to the Department of Anæsthetics for a period of 1 year in the first instance, from 1st October.

Applications, including names and addresses of 2 referees, to the Clerk of the Governors by 23rd July, 1955.

ST. THOMAS'S HOSPITAL, London, S.E.1. House PHYSICIAN to the Department of Psychological Medicine for a period of 6 months from 15th August.

Applications, including copies of recent testimonials, to the Clerk of the Governors by 16th July, 1955.

WEST END HOSPITAL FOR NEUROLOGY AND NEUROSURGERY, 91, Dean-street, W.1. Applications are invited for the resident post of SENIOR HOUSE SURGEON. Candidates should have had surgical experience and previous neurological and neurosurgical experience would be an advantage.

Applications, stating age, qualifications, experience, together with the names and addresses of 2 referees, to reach the Hospital Secretary by 23rd July, 1955.

WEST LONDON HOSPITAL, Hammersmith-road London, W.6. HOUSE SURGEON (general and orthopædic) required 1st September. Pre-registration candidates considered.

Applications, stating age, qualifications, experience, copies of 2 recent testimonials, to Secretary by 18th July.

WEST LONDON HOSPITAL, Hammersmith-road, W.6. Applications invited for following posts:—

2 RESIDENT CASUALTY OFFICERS (Senior House Officer grading), 1 from 26th July, 1 from 11th August.

RESIDENT SENIOR HOUSE OFFICER (anæsthetics), 1st September.

Applications, stating age, qualifications, experience, copies of 2 recent testimonials, to Secretary, by 16th July.

WHIPPS CROSS HOSPITAL, London, E.11. Leytonstone (NO. 10) HOSPITAL GROUP. Applications are invited from fully qualified medical practitioners for the post of ORTHOPÆDIC HOUSE SURGEON at above Hospital. This post, which is recognised for the F.R.C.S. examination, will be vacant from 1st September, 1955.

Application forms from the Hospital Secretary, to be returned by 23rd July, 1955.

WILLESDEN GENERAL HOSPITAL, Harlesden-road, N.W.10. RESIDENT CASUALTY OFFICER (Senior House Officer grade) required 1st August. 6 months appointment. Post recognised under Fellowship regulations. £170 p.a. deduction for residence.

Applications, with names of 2 referees, to Hospital Secretary, by 20th July, 1955.

WILLESDEN GENERAL HOSPITAL, Harlesden-road, N.W.10. Locum RESIDENT CASUALTY OFFICER required 19th July–1st August, 1955. 14 guineas per week, less £170 p.a. for residence.

Applications to Hospital Secretary.

WOOLWICH GROUP HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (anæsthetics). 2 posts vacant early August at Memorial Hospital, Woolwich, and at St. Nicholas Hospital, Plumstead. Recognised for F.F.A.R.C.S. and D.A. 6 months appointment and may then be renewed. Salary £745 p.a., less £150 for residence.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

ABERYSTWYTH GENERAL HOSPITAL. Mid Wales HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER at the above Hospital. Post recognised for F.R.C.S. Vacant on 1st August, 1955. The post is resident.

Applications, stating age, nationality, qualifications, and experience, accompanied by copies of 2 recent testimonials, should be sent to the Group Secretary, "Orlandon," North-parade, Aberystwyth, within 14 days from the publication of this advertisement.

ASHFORD HOSPITAL, Ashford, Middlesex. Staines GROUP HOSPITAL MANAGEMENT COMMITTEE. CLINICAL ASSISTANT for Ophthalmic Unit required for 2 notional half-days per week, at present Monday A.M. and Wednesday P.M.

Applications to Medical Director, Ashford Hospital, London-road, Ashford, Middlesex.

ASHFORD HOSPITAL, Ashford Middlesex. Staines GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, RESIDENT HOUSE OFFICER (Male) for general surgical and medical duties. Post not suitable for pre-registration candidates.

Applications, stating age, qualifications, and experience, with copies of up to 3 recent testimonials, to Medical Director of Hospital immediately.

ASHTON, HYDE AND GLOSSOP HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON required at Ashton-under-Lyne General Hospital. Preference will be given to pre-registration applicants. Recognised for F.R.C.S. (Eng.).

Applications, stating age, nationality, qualifications and experience, together with copies of 3 testimonials, should be forwarded to the Group Secretary, Ashton-under-Lyne General Hospital, Ashton-under-Lyne, as soon as possible.

AYLESBURY, BUCKINGHAMSHIRE. TINDAL GENERAL HOSPITAL. HOUSE SURGEON (general surgery), vacant now. Recognised for F.R.C.S. Pre-registration post but registered practitioners invited to apply, with 2 testimonials, to the Administrative Officer forthwith. Further details on request.

BARNSTAPLE. NORTH DEVON INFIRMARY. (110 Beds.) HOUSE SURGEON (pre-registration). Post vacant mid-July.

Applications to Group Secretary, North Devon Hospital Management Committee, 19, Alexandra-road, Barnstaple.

BATH. ROYAL NATIONAL HOSPITAL FOR RHEUMATIC DISEASES. Applications are invited from registered medical practitioners for the post of HOUSE PHYSICIAN at the above Hospital attached to which is the Rheumatism Research Unit of the South-Western and Oxford Regions. Vacancy occurs approximately mid-July. The Hospital is recognised for part II of the Diploma in Physical Medicine.

Applications, stating age, qualifications and experience, with 3 testimonials, should be forwarded to Group Secretary, Bath Hospital Management Committee, Manor Hospital, Combe Park, Bath.

BEDFORD GENERAL HOSPITAL. (437 Beds.) Locum CASUALTY OFFICER (Registrar grade) required pending permanent appointment. Salary £17 10s. per week.

Applications, stating age, nationality, qualifications, and previous appointments, together with copies of 2 recent testimonials, should be forwarded to Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford.

BEDFORD GENERAL HOSPITAL. (437 Beds.) Resident Pre-registration HOUSE PHYSICIAN required on 4th August.

Applications, stating age, nationality, qualifications, previous appointments (if any), together with copies of 2 recent testimonials, should be forwarded to Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford, by not later than 16th July, 1955.

BIRMINGHAM ACCIDENT HOSPITAL, Birmingham, 15. (215 Beds.) RESIDENT HOUSE SURGEON, vacant September. Recognised for F.R.C.S. Appointment for 6 months in General Accident Service and (at applicant's request) includes period in 32-Bedded Burns Unit.

Apply Administrator.

BIRMINGHAM AND MIDLAND EAR AND THROAT HOSPITAL, Edmund-street, BIRMINGHAM, 3. HOUSE OFFICER required. Pre-registration considered.

Detailed applications, with copies of 2 recent testimonials, to Secretary, Dudley Road Hospital, Birmingham, 18.

BIRMINGHAM, 18. DUDLEY ROAD HOSPITAL. (780 Beds.) 3 HOUSE SURGEONS required. Recognised for pre-registration and F.R.C.S. Each appointment in unit of approximately 85 adult and children's general surgical beds under control of 2 Consultant Surgeons. 1 vacant immediately, others 10th July and 1st August.

Detailed applications, with copies of 3 recent testimonials, to Secretary.

BIRMINGHAM REGIONAL HOSPITAL BOARD.

(1) **Dudley Group, Guest Hospital, Dudley**

REGISTRAR in General Surgery for Guest Hospital (154 Beds). Experience specialty essential. Higher qualifications desirable. Resident.

(2) **Walsall Group, Wednesbury-road, Walsall**

REGISTRAR in General Surgery for General Hospital (181 Beds). Experience specialty essential. Married quarters available.

Application forms from Group Secretaries, to be returned before 25th July, 1955. Candidates may visit hospitals.

BIRMINGHAM. THE SKIN HOSPITAL, INPATIENTS' DEPARTMENT, George-road, BIRMINGHAM, 15. SENIOR HOUSE OFFICER or HOUSE OFFICER according to experience (required mid-August). Modern well-equipped Inpatients' Department, providing facilities for study of skin diseases. Required to assist Consultant at outpatient clinics.

Applications, with copies of 2 recent testimonials, to Secretary, Dudley Road Hospital, Birmingham, 18.

BROXBURN, WEST LOTHIAN. BANGOUR GENERAL HOSPITAL. EAR, NOSE AND THROAT UNIT. Applications are invited for the post of REGISTRAR in the E.N.T. Unit at Bangour General Hospital, Broxburn, which is 15 miles from Edinburgh, which carries certain minimal duties at the Royal Infirmary, Edinburgh. The Unit comprises 30 Beds and also undertakes oral dental surgery. Salary and conditions of service will be in accordance with the regulations.

Applications, giving age, qualifications, and particulars of previous experience, should be lodged with the Group Medical Superintendent, Bangour General Hospital, Broxburn, West Lothian.

BLACKPOOL. VICTORIA HOSPITAL. House Physician post (pre-registration) available mid-September.

Applications, stating age, qualifications and experience (if any), with the names of 2 referees, should be sent to the Hospital Secretary.

BLACKBURN AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER required for new Geriatric Department, under control of Consultant Geriatrician. There are 360 geriatric beds at Queen's Park Hospital, Blackburn, Springfield Annexe to Royal Infirmary, Blackburn, and Clitheroe Hospital, Clitheroe.

Applications, with names of 2 referees, to Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn.

BLACKBURN AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (pathology). Duties at Royal Infirmary, Blackburn (Group Laboratory), but may also be required for duties at Queen's Park Hospital, Blackburn, and Victoria Hospital, Accrington, at Consultant's discretion. Recognised for D.Path.

Applications, with names of 2 referees or copies of testimonials, to Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn.

BLACKBURN AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (obstetrics and gynæcology). Recognised for M.R.C.O.G. and D.Obst. R.C.O.G. (combined obstetrics and gynæcology). Based on Queen's Park Hospital, Blackburn (a general hospital with 83 obstetric/gynæcological beds) with duties at Royal Infirmary, Blackburn, and occasionally at Victoria Hospital, Accrington.

Applications, with names of 2 referees or copies of testimonials, to Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn.

BISHOP'S STORTFORD AND DISTRICT HOSPITAL, Rye-street, BISHOP'S STORTFORD, HERTS. (67 Beds—medical, surgical and maternity. Midway between London and Cambridge. Main Line Railway from Liverpool Street.) Applications are invited from registered medical practitioners for the appointment of RESIDENT SENIOR HOUSE OFFICER. Appointment to commence as soon as possible. Salary £745 p.a.

Applications, stating age, nationality, qualifications and experience, with copies of recent testimonials or names of referees, should be sent to the Hospital Secretary, Haymeads Hospital, Bishop's Stortford, Herts.

BOLTON. THE ROYAL INFIRMARY. (237 Beds.) BOLTON AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. RESIDENT SENIOR HOUSE OFFICER in Orthopædic Surgery, vacant August, tenable for 12 months and recognised for F.R.C.S.

Applications, stating age, nationality, qualifications, experience, and the names of 2 referees, to Group Secretary, The Royal Infirmary, Bolton.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL. (494 Beds.) BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of RESIDENT OBSTETRIC OFFICER, vacant 11th August, 1955. The appointment is recognised for the F.R.C.S. examination and for the Diploma of Obstetrics but not for pre-registration purposes.

Applications to the Deputy Hospital Secretary.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL. (494 Beds.) BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of a SENIOR HOUSE OFFICER (resident), orthopædic and casualty combined. The post which becomes vacant on 18th July is recognised for the F.R.C.S. examination and is tenable for 12 months.

Applications to the Deputy Hospital Secretary.

BRADFORD. ST. LUKE'S HOSPITAL. Senior House OFFICER (anæsthetics), vacant 8th August. Salary £745 p.a., less £150 p.a. residential emoluments. Opportunities for plastic and intra-thoracic experience and recognised for D.A. and F.F.A.R.C.S.

Applications, stating age, nationality, qualifications, and experience, with copy testimonials, to Secretary, Bradford Royal Infirmary.

BRADFORD. ST. LUKE'S HOSPITAL AND WOODLANDS HOSPITAL, RAWDON, near LEEDS.

SENIOR HOUSE OFFICER to Orthopædic Unit, with duties at both hospitals, vacant now. Salary £745 p.a., less £150 p.a. residential emoluments.

JUNIOR HOUSE OFFICER to Orthopædic Unit with duties at both hospitals, vacant now. Salary £425–£525 p.a., less £125 p.a. residential emoluments.

Applications, stating age, nationality, qualifications and experience with copy testimonials, to the Secretary, Bradford Royal Infirmary.

BRADFORD. ROYAL EYE AND EAR HOSPITAL. HOUSE SURGEON (ophthalmology), vacant 16th July. Recognised for D.O.M.S. and F.R.C.S. Salary according to Whitley Council (MDB) rates.

Applications, stating age, nationality, qualifications, and experience, with copy testimonials, to Secretary, Bradford Royal Infirmary.

BRAINTREE. BLACK NOTLEY HOSPITAL. (544 Beds.) Applications invited for post of SENIOR HOUSE OFFICER for Non-pulmonary Tuberculosis Unit of approximately 120 Beds, particularly for skeletal and renal tuberculosis. Recognised for F.R.C.S.

Applications, with copies of 3 testimonials, to Group Secretary, Colchester Hospital Management Committee, 14, Pope's-lane, Colchester, Essex.

BRISTOL-COSSHAM FRENCHAY HOSPITAL MANAGEMENT COMMITTEE. FRENCHAY HOSPITAL. (513 staffed beds, expanding.) Applications are invited for the post of SENIOR HOUSE OFFICER in the regional Neurosurgery Department, vacant end of July. This post offers useful surgical experience and the opportunity of gaining a working knowledge of neurological diagnosis. Recognised for F.R.C.S.

Applications to the Secretary, Frenchay Hospital, quoting "N.S.F." Names of 2 referees required.

BRIGHTON. SUSSEX EYE HOSPITAL, Eastern-road, BRIGHTON, 7. (56 Beds.) SENIOR HOUSE SURGEON (Senior House Officer) required. Recognised for F.R.C.S. and D.O.

Applications, stating age, qualifications and experience, and naming 2 referees, to the Administrative Officer, Royal Sussex County Hospital, Brighton, 7.

CAERNARVON AND ANGLESEY HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the following posts :—

HOUSE SURGEON—Caernarvon and Anglesey General Hospital, Bangor.

HOUSE SURGEON—Llandudno General Hospital, Llandudno.

The hospitals are both recognised by the Royal College of Surgeons. The appointments are for a period of 6 months. Salary and conditions of service in accordance with those approved by the Ministry of Health.

Applications, stating age, qualifications and experience, together with the names and addresses of 2 referees, to be forwarded to the Group Secretary, Plas Gwyn, Ffriddoedd-road, Bangor, within 10 days of appearance of this advertisement.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (276 Beds.) PÆDIATRIC HOUSE PHYSICIAN. The post, recognised for D.C.H., includes work in the ward and Outpatient Department and also provides experience in the care of the newborn. Opportunities exist for the study of preventive medicine among children and child guidance work. Post now vacant. National Health Service salary and conditions.

Applications, together with 2 testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (276 Beds.) GYNÆCOLOGICAL HOUSE SURGEON required at Highland Court Annexe, a unit of 25 gynæcological beds situated 3 miles from the above Hospital, with all ancillary services available. Recognised for M.R.C.O.G. 6 months appointment. Post now vacant. National Health Service salary and conditions.

Applications, together with copies of 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CARMARTHEN. WEST WALES GENERAL HOSPITAL. (188 Beds. Recognised by the Royal College of Surgeons and for Pre-registration Service.) WEST WALES HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT HOUSE OFFICER (medical) which will become vacant at the beginning of August next. Salary and conditions of service as laid down by the Ministry of Health.

Applications, stating age, qualifications, experience, nationality, with names and addresses of 3 referees, to the Group Secretary, West Wales Hospital Management Committee, Glangwili, Carmarthen.

CHELMSFORD HOSPITAL MANAGEMENT COMMITTEE. Resident Locum Tenens REGISTRAR to the Department of Pathology in Chelmsford from the middle of August. Previous experience in pathology essential. Higher qualifications not necessary.

Apply Secretary, Chelmsford Hospital Management Committee, London-road, Chelmsford.

CHELMSFORD AND ESSEX HOSPITAL. Locum Tenens REGISTRAR in Surgery required to work at the above Hospital for period 30th July–27th August. Preference will be given to applicants holding F.R.C.S.

Applications to the Secretary, Chelmsford Hospital Management Committee, London-road, Chelmsford.

CHELMSFORD AND ESSEX HOSPITAL. (162 Beds.) Applications are invited for the post of RESIDENT HOUSE SURGEON (pre-registration post). The post will become vacant on 13th July and offers good surgical experience and is recognised for the F.R.C.S.

Applications, together with 2 recent testimonials, to the Secretary, Chelmsford Hospital Management Committee, London-road, Chelmsford.

CHELMSFORD. ST. JOHN'S HOSPITAL. (70 surgical Beds.) Applications are invited for the appointment of RESIDENT SURGICAL OFFICER (Senior House Officer grade) at above Hospital. The post which becomes vacant on 1st September, 1955, is recognised for the F.R.C.S. and the successful candidate will gain excellent practical experience in general surgery, with good opportunity for preparation for higher qualifications. A House Surgeon is in residence.

Applications, stating age, nationality, present appointment and previous appointments, both with dates, together with the names and addresses of 2 referees, to be sent to the Group Secretary, Chelmsford Hospital Management Committee, Chelmsford and Essex Hospital, London-road, Chelmsford.

CHEPSTOW, MONMOUTHSHIRE. PLASTIC SURGERY JAW INJURIES AND BURNS CENTRE, ST. LAWRENCE HOSPITAL. (100 plastic surgery, 50 orthopædic beds.) SENIOR HOUSE OFFICER in Plastic Surgery required. Previous experience in specialty not essential. The successful candidate will receive a thorough training in plastic surgery and burns. Hospital intakes from most of Wales and provides extensive experience. There is another Senior House Officer in plastic surgery and also a Senior House Officer in orthopædics. Salary £745, less £150 board-residence.

Write, quoting 2 referees, to T. A. JONES, Group Secretary, 64, Cardiff-road, Newport, Mon.

AMENDED ADVERTISEMENT

COULSDON, SURREY. CANE HILL HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR in Psychiatry, whole-time, resident (if unmarried) or non-resident. The hospital has 4 outpatient clinics and undertakes postgraduate teaching in association with the Institute of Psychiatry. Every facility will be given for further study. Candidates may visit the Hospital by arrangement with the Physician-Superintendent.

Application forms, returnable within 14 days, may be obtained from the Group Secretary.

COULSDON, SURREY. NETHERNE HOSPITAL. Applications are invited for the post of SENIOR HOUSE OFFICER. All modern forms of treatment carried out in this Hospital of 2000 Beds which is recognised for the D.P.M. The Physician-Superintendent will give further information or arrange for the Hospital to be visited.

Apply for application forms from Secretary without delay.

COLCHESTER. ESSEX COUNTY HOSPITAL. (189 Beds.) Applications invited for post of SENIOR HOUSE OFFICER (anæsthetics). Post tenable for 1 year. Recognised for D.A. The successful candidate will be called upon to give anæsthetics in other hospitals in the Group.

Applications, with copies of 3 testimonials, to Group Secretary, Colchester Hospital Management Committee, 14, Pope's-lane, Colchester, Essex.

COLCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for :—

Essex County Hospital, Colchester (189 Beds)

HOUSE OFFICER (surgical). First, second, third, or pre-registration post ; tenable for 6 months.

Black Notley Hospital, Braintree, Essex (544 Beds)

HOUSE OFFICER (orthopædic surgery). First, second, third, or pre-registration post ; tenable for 6 months. Recognised for F.R.C.S.

Black Notley Hospital, Braintree, and Essex County Hospital, Colchester

HOUSE SURGEON (first, second, third, or pre-registration post), tenable for 6 months. Duties to include work in general surgical and gynæcological wards. Recognised for F.R.C.S.

Essex County Hospital, Colchester (19 gynæcological beds) **Colchester Maternity Hospital** (22 obstetric beds)

HOUSE OFFICER (Male or Female), obstetric and gynæcological. First, second, third, or pre-registration post ; tenable for 6 months.

Applications, with copies of 3 testimonials, to Group Secretary, 14, Pope's-lane, Colchester, Essex.

CREWE AND DISTRICT MEMORIAL HOSPITAL. (108 Beds and Annexe 34 Beds—Acute.) SOUTH CHESHIRE HOSPITAL MANAGEMENT COMMITTEE. RESIDENT SENIOR HOUSE OFFICER (medical) required. Salary in accordance with Whitley Council scale.

Applications, stating age, qualifications and experience, together with copies of recent testimonials, or the names of 2 referees, to be sent as soon as possible to the Group Secretary, Barony Hospital, Nantwich.

CREWE AND DISTRICT MEMORIAL HOSPITAL. (108 Beds and Annexe 34 Beds—Acute.) SOUTH CHESHIRE HOSPITAL MANAGEMENT COMMITTEE. RESIDENT HOUSE OFFICER (surgical) required at the above Hospital (approved for F.R.C.S.). Normally tenable for 6 months. Salary £425–£525, less £125 for residential emoluments.

Apply, stating age, qualifications, experience, &c., with names of 2 referees, to the Group Secretary, Barony Hospital, Nantwich, Cheshire.

CROMER AND DISTRICT HOSPITAL, Norfolk. Applications are invited for the post of RESIDENT MEDICAL OFFICER (Senior House Officer status). Post vacant August, 1955, at a salary of £745 p.a., in accordance with conditions of service issued by the Ministry of Health. This is a busy general hospital of 50 Beds which has a preconvalescent annexe of 64 Beds and an Outpatient Department where Consultants in all the major specialties hold regular sessions. The appointment thus offers practical experience of an all-round kind particularly useful to those contemplating entry into general practice. Residential accommodation available or furnished flat for married man.

Applications, stating age, qualifications, experience, sex, and the names of 2 referees, should be addressed to the Secretary, Cromer Area Hospital Management Committee, Cliff-avenue, Cromer.

CROYDON. MAYDAY HOSPITAL, Thornton Heath, SURREY. (618 Beds.) CROYDON GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. SURGICAL REGISTRAR (whole-time, resident or non-resident). Post vacant early August. Candidates should have good medical and surgical background and preferably hold the F.R.C.S. qualification. Previous operative experience essential. There are 2 Surgical Teams at Hospital. Post recognised for F.R.C.S. examination.

Application forms obtainable from GEORGE A. PAINES, Secretary, Hospital Management Committee, General Hospital, Croydon, to be returned by 18th July.

DENBIGH. THE NORTH WALES HOSPITAL FOR NERVOUS AND MENTAL DISORDERS. JUNIOR HOSPITAL MEDICAL OFFICER or SENIOR HOUSE OFFICER required. A house on the Hospital estate, or single quarters, available. The Hospital has modern treatment facilities, and is recognised by the Conjoint Board for the purpose of their D.P.M. examination.

Applications, with names of 2 referees, to the Medical Superintendent.

S. L. FROST, Secretary to the Management Committee.

DONCASTER ROYAL INFIRMARY. (Recognised under the regulations for the Fellowship and D.L.O.) DONCASTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER in the E.N.T. Department. Post vacant now.

Applications to the Secretary to the Committee at the Doncaster Royal Infirmary.

DONCASTER ROYAL INFIRMARY. (330 Beds. Recognised for training for F.R.C.S.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT SURGICAL REGISTRAR required. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 18th July, 1955, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

DONCASTER HOSPITAL MANAGEMENT COMMITTEE. HOUSE PHYSICIAN (Senior House Officer) between Western Hospital, Doncaster, and Doncaster Royal Infirmary. Resident at Western Hospital.

Applications to the Secretary to the Committee at the Doncaster Royal Infirmary by 25th July, 1955.

DERBY. DERBYSHIRE ROYAL INFIRMARY. Senior HOUSE OFFICER (anæsthetics), vacant 1st August, 1955. Recognised for D.A.

Apply, stating full particulars, with copies of 2 testimonials, to Hospital Secretary.

DERBY. DERBYSHIRE ROYAL INFIRMARY. Resident SENIOR HOUSE OFFICER (Orthopædic and Accident Service), vacant 22nd July, 1955. Recognised for F.R.C.S.

Apply, with full details and copies of 2 testimonials, to Hospital Secretary.

EASTBOURNE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of GYNÆCOLOGICAL HOUSE SURGEON (30 Beds). With duties in abnormal Obstetric Unit (14 Beds).

Applications, stating age, nationality, qualifications, and experience, with copies of 2 recent testimonials, to the Group Secretary, 29, Bedfordwell-road, Eastbourne.

EAST ANGLIAN REGIONAL HOSPITAL BOARD.

(1) MEDICAL REGISTRAR, East Suffolk and Ipswich Hospital. Post provides wide experience in general medicine. Single quarters available. Appointment for 1 year, renewable for second year. Candidates invited to visit Hospital by direct arrangement with Hospital Management Committee Secretary.

(2) SURGICAL REGISTRAR, North Cambridgeshire Hospital, Wisbech. Post provides good training and experience in both general and orthopædic surgery. Appointment for 1 year, renewable for second year. Candidates invited to visit Hospital by direct arrangement with Hospital Management Committee Secretary at the Hospital.

Applications, stating age, experience and names of 3 referees, to Secretary of Board, 117, Chesterton-road, Cambridge, by 18th July, 1955.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. REGISTRAR in E.N.T. Surgery, Norfolk and Norwich Hospital and Jenny Lind Children's Hospital, Norwich. Post recognised for D.L.O. and F.R.C.S. Appointment for 1 year, renewable for second year.

Applications, stating age, experience, and names of 3 referees, to Secretary of Board, 117, Chesterton-road, Cambridge, by 25th July, 1955. Candidates invited to visit Hospital by direct arrangement with Hospital Management Committee Secretary, Norfolk and Norwich Hospital.

EDGWARE GENERAL HOSPITAL, Edgware, Middlesex. (715 Beds.) 2 RESIDENT OBSTETRIC HOUSE SURGEONS for above Hospital. Posts vacant 6th and 31st August, 1955. 6 months appointments. Posts recognised for M.R.C.O.G. purposes.

Applications, stating age, qualifications, experience, and enclosing copies of up to 3 recent testimonials, to Medical Director of Hospital by 16th July, 1955.

EDGWARE GENERAL HOSPITAL, Edgware, Middlesex. (715 Beds.) RESIDENT HOUSE SURGEON (general and genito-urinary surgery) for above Hospital. Post vacant 6th August, 1955. 6 months appointment. Post recognised for F.R.C.S. and pre-registration purposes.

Applications, stating age, qualifications, experience, and enclosing copies of up to 3 recent testimonials, to Medical Director of Hospital by 16th July, 1955.

EDGWARE GENERAL HOSPITAL, Edgware, Middlesex. (715 Beds.) RESIDENT HOUSE PHYSICIAN for above Hospital. Post vacant 24th August, 1955. 6 months appointment. Post recognised for pre-registration purposes.

Applications, stating age, qualifications, experience, and enclosing copies of up to 3 recent testimonials, to Medical Director of Hospital by 16th July, 1955.

EDINBURGH, 9. BRUNTSFIELD HOSPITAL FOR WOMEN AND CHILDREN, 1A, Whitehouse-loan. (81 Beds.) Applications are invited from registered or provisionally registered Women medical practitioners for the 2 posts of :—

(1) HOUSE SURGEON (general surgery).
(2) HOUSE SURGEON (gynæcology).

Posts vacant 1st October, 1955. Appointments are for 6 months in each case and are recognised for pre-registration. Salary according to national scale (Scotland).

Applications, with copies of testimonials, to the Medical Superintendent, Southern Hospitals Board of Management, 21, Hill-street, Edinburgh, 2.

EDINBURGH NORTHERN GROUP OF HOSPITALS. SENIOR HOUSE OFFICER required for Department of Radiotherapy, Western General Hospital. The post is non-resident and will commence on 1st September, 1955, for 6 months in the first instance.

Applications, with names and addresses of 2 referees, to the Medical Superintendent, Western General Hospital, Edinburgh, 4.

EDINBURGH NORTHERN GROUP OF HOSPITALS. JUNIOR HOSPITAL MEDICAL OFFICER in Anæsthetics required. In the first instance the appointment will be to the Eastern General Hospital. The post is non-resident and will fall vacant on 1st October, 1955. Hospital recognised in D.A. regulations. Salary £775–£50–£1075.

Applications, with names and addresses of 2 referees, to the Medical Superintendent, Western General Hospital, Edinburgh, 4.

EPSOM, SURREY. THE MANOR HOSPITAL. Applications are invited for the appointment of SENIOR HOUSE OFFICER or JUNIOR HOSPITAL MEDICAL OFFICER at The Manor—a hospital with specialised facilities for the socio-industrial habilitation of high-grade defectives. This Hospital is recognised by the Conjoint Board for 12 of the 24 months training required under the D.P.M. regulations.

Apply, with names of 2 referees, to Physician-Superintendent.

EPSOM DISTRICT HOSPITAL, Dorking-road, Epsom, SURREY. EPSOM GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for Whole-time REGISTRAR (general medicine) at above Hospital. Resident or non-resident vacancy 20th October, 1955. Candidates may visit by appointment with Consultant concerned.

Forms of application (send stamped addressed foolscap envelope) may be obtained from Group Secretary, Epsom District Hospital for completion and returned by 23rd July, 1955.

EPPING. ST. MARGARET'S HOSPITAL. (485 Beds.) SENIOR HOUSE OFFICER (resident) required for Chest Department and to act as Second Resident Anæsthetist. Good opportunity for experience in modern methods. Previous experience in chest diseases desirable but not essential.

Applications, with references, to reach Group Secretary, St. Margaret's Hospital, Epping, Essex, by 15th July.

ENFIELD WAR MEMORIAL HOSPITAL. (General Practitioner—61 Beds.) Locum SENIOR HOUSE OFFICER (resident), required 31st July–13th August, 1955.

Apply, with names of 2 referees, to the Group Secretary, Chase Farm Hospital, Enfield, Middlesex, as soon as possible.

EXETER. WEST OF ENGLAND EYE INFIRMARY. EXETER AND MID-DEVON HOSPITALS MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the appointment of SENIOR HOUSE OFFICER in Ophthalmology. Resident or non-resident. Vacant 1st September, 1955. The post is recognised for the F.R.C.S. examination.

Applications, with copies of 2 recent testimonials, to the Hospital Secretary by 23rd July, 1955.

GLASGOW, N.1. STOBHILL GENERAL HOSPITAL. In the term beginning 1st August, vacancies for HOUSE OFFICERS (pre-registration) exist in the following units : Medicine (Acute Geriatrics), Dermatology.

Applications, giving the names of 2 referees, should be addressed to the Medical Superintendent.

GRANTHAM AND KESTEVEN GENERAL HOSPITAL. (115 Beds.) SHEFFIELD REGIONAL HOSPITAL BOARD. SECOND RESIDENT SURGICAL OFFICER with duties in orthopædics, gynæcology, E.N.T., and relief duties for Resident Surgical Officer required at Registrar rate of pay from 17th September. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 18th July, 1955, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

GRIMSBY GENERAL HOSPITAL. (226 Beds.) Sheffield REGIONAL HOSPITAL BOARD. Whole-time RESIDENT or NON-RESIDENT MEDICAL REGISTRAR required. Hospital has up-to-date Medical Library. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 18th July, 1955, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

GRIMSBY GENERAL HOSPITAL, Grimsby, Lincolnshire. (238 Beds.) GRIMSBY HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of JUNIOR HOSPITAL MEDICAL OFFICER (orthopædic). Unit of 47 Beds. The position may be resident or non-resident by arrangement. Up-to-date Medical Library and reading facilities available. Salary £775–£50–£1075 p.a., with appropriate deduction if resident.

Applications, stating age, qualifications, experience, &c., with names of 3 referees, to be forwarded to the Hospital Secretary, as soon as possible.

GUILDFORD. ST. LUKE'S HOSPITAL. Guildford Group HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the post of Whole-time REGISTRAR (preferably resident) in the Radiotherapy Unit at above Hospital, where extensive experience in both surgical and radiation treatment of malignant disease can be obtained. Candidates may visit the Unit by arrangement direct.

Application forms obtainable from Secretary, Guildford Group Hospital Management Committee, St. Luke's Hospital, Guildford, to whom they should be returned not later than 22nd July, 1955.

HALIFAX. NORTHOWRAM HALL HOSPITAL. (108 Beds.) SENIOR HOUSE OFFICER in Chest Diseases required. Duties include attendance at busy chest clinic at the Royal Halifax Infirmary and non-tuberculous chest ward work at the Halifax General Hospital. This is a new appointment offering excellent facilities for the study of chest diseases. Salary £745 p.a., with deduction of £130 p.a. for board, residence, &c.

Apply to the Group Secretary, Royal Halifax Infirmary, Halifax.

HALIFAX. ROYAL HALIFAX INFIRMARY. (301 Beds.) SENIOR HOUSE OFFICER in Casualty and Orthopædic Surgery required. Post recognised for F.R.C.S. Salary £745 p.a., with deduction of £130 p.a. for board, residence, &c.

Apply to the Group Secretary, Royal Halifax Infirmary, Halifax.

HALIFAX. ROYAL HALIFAX INFIRMARY. (301 Beds.) SENIOR HOUSE OFFICER in Anæsthetics required. Post now vacant. Salary £745 p.a., with deduction of £130 p.a. for board, residence, &c.

Apply to the Group Secretary, Royal Halifax Infirmary, Halifax.

HALIFAX. ST. JOHN'S HOSPITAL. (382 Beds.) Senior HOUSE OFFICER in Geriatrics and General Medicine required. Post vacant early July. Salary £745 p.a., with deduction of £130 p.a. for board, residence, &c.

Applications to the Group Secretary, Royal Halifax Infirmary, Halifax.

HAROLD WOOD HOSPITAL, Harold Wood, Essex. (415 Beds.) Locum SENIOR REGISTRAR (medicine) required full-time for 3 months at Major General and Casualty Hospital of Group. Resident or non-resident. Higher qualifications necessary.

Applications, with names of 2 referees, as soon as possible to Group Secretary, Brentwood Group Hospital Management Committee, High Wood Hospital, Brentwood, Essex.

HAVERFORDWEST. PEMBROKE COUNTY WAR MEMORIAL HOSPITAL. (163 Beds. Recognised by the Royal College of Surgeons and for Pre-registration Service.) WEST WALES HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT HOUSE OFFICER (surgical) which will become vacant at the end of July. Salary and conditions of service as laid down by the Ministry of Health.

Applications, stating age, qualifications, experience, nationality, with names and addresses of 3 referees, to the Group Secretary, West Wales Hospital Management Committee, Glangwili, Carmarthen.

HAVERFORDWEST. PEMBROKE COUNTY WAR MEMORIAL HOSPITAL. (163 Beds. Recognised by the Royal College of Surgeons and for Pre-registration Service.) WEST WALES HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER (surgical) which will become vacant at the end of July. Salary and conditions of service as laid down by the Ministry of Health.

Applications, stating age, qualifications, experience, nationality, with names and addresses of 3 referees, to the Group Secretary, West Wales Hospital Management Committee, Glangwili, Carmarthen.

HAVERFORDWEST. PEMBROKE COUNTY WAR MEMORIAL HOSPITAL. (163 Beds. Recognised by the Royal College of Surgeons and for Pre-registration Service.) WEST WALES HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT HOUSE OFFICER (medical) which will become vacant at the end of July. Salary and conditions of service as laid down by the Ministry of Health.

Applications, stating age, qualifications, experience, nationality, with names and addresses of 3 referees, to the Group Secretary, West Wales Hospital Management Committee, Glangwili, Carmarthen.

HEMEL HEMPSTEAD, HERTFORDSHIRE. WEST HERTS HOSPITAL. HOUSE SURGEON (pre-registration). Post vacant 18th July, 1955.

Applications, mentioning 2 names for reference should be sent to the Hospital Secretary.

HEREFORD. GENERAL HOSPITAL. (154 Beds.) House OFFICER (paediatrics) required.

Applications, with copies of 2 recent testimonials, to Group Secretary, Hospital Management Committee, Victoria House, Eign-street, Hereford.

HIGH WYCOMBE AND DISTRICT WAR MEMORIAL HOSPITAL. (165 Beds. 6 residents.) SENIOR HOUSE OFFICER (surgical) required. £745 p.a., less emoluments. Appointment for 12 months. Post recognised for F.R.C.S. examination.

Applications, with names of 2 referees, to Group Secretary, St. Mary's Cottage, High Wycombe.

AMENDED ADVERTISEMENT

HORNCHURCH. ST. GEORGE'S HOSPITAL. Neurosis UNIT. (20 Beds.) REGISTRAR in Psychiatry required July–December, 1955, for work with psychoneurotic and psychosomatic inpatients. Some general psychiatric experience necessary with an interest in psychotherapy. Accommodation available for a Female candidate: or hospital accessible daily from London.

Applications, with names of 2 referees, to the Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford, from whom further information can be obtained.

HORNCHURCH. ST. GEORGE'S HOSPITAL. (Neurosis UNIT.) Locum REGISTRAR in Psychiatry required for 6 weeks between July and September.

Applications, with dates available and names of 2 referees, to Group Secretary, Oldchurch Hospital, Romford, from whom further information can be obtained.

HUDDERSFIELD ROYAL INFIRMARY. (312 Beds.) HUDDERSFIELD HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON required to commence duty immediately. The post is recognised as a pre-registration appointment and for the F.R.C.S. Salary in accordance with national scale.

Applications, together with copies of 3 recent testimonials, to be addressed to the undersigned as soon as possible.

H. J. JOHNSON, Secretary to the Management Committee.

The Royal Infirmary, Huddersfield.

HULL. VICTORIA HOSPITAL FOR SICK CHILDREN, Park-street. HULL A GROUP HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON required on 4th August, 1955. Pre-registration or registration post. 6-monthly term, recognised for D.C.H. qualification. Salary according to national scale.

Send replies, with testimonials, to the Hospital Secretary.

HULL. MATERNITY HOSPITAL. (74 Beds.) Hull A GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE OFFICER (obstetrics). This Maternity Hospital deals with all the emergency obstetrics in Hull and the East Riding of Yorkshire. The post offers excellent opportunities to gain experience in all branches of obstetrics. There are 3 House Officers on the establishment, and all these posts, together with that of the Senior House Officer, are recognised by the Royal College of Obstetricians and Gynæcologists for the Diploma and Membership examinations.

Apply, stating nationality, age, qualifications and experience, together with 3 testimonials, to the Secretary, Maternity Hospital, Hedon-road, Hull, as soon as possible.

HULL. KINGSTON GENERAL HOSPITAL. (428 Beds.) HULL A GROUP HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE SURGEON (recognised for the F.R.C.S. examinations). There are 69 general surgical beds and some supervision is required of 17 gynæcological beds. Salary £745, less emoluments. Post vacant 1st August, 1955.

Applications, giving full details, and copies of 2 recent testimonials, to the Hospital Secretary.

HERTFORD COUNTY HOSPITAL. (171 Beds. Hospital situated 21 miles from London.) Applications are invited for appointment of HOUSE SURGEON (general, gynæcology, and obstetrics—first or second post). Recognised under F.R.C.S. regulations, pre-registration post. Duties to commence 23rd July, 1955.

Applications to Group Secretary, Hertford Hospital Management Committee, County Hospital, Hertford, Herts.

IPSWICH AND EAST SUFFOLK HOSPITAL (Heath Road Wing), IPSWICH. (270 Beds.) Applications are invited for the pre-registration post of HOUSE SURGEON to General Surgeon vacant on 15th August, 1955. The post, which is recognised for the R.C.S. examinations, is normally of 6 months duration, and is of House Officer grade.

Applications, stating age, experience, and qualifications, together with copies of recent testimonials, to the Hospital Secretary.

ISLEWORTH. WEST MIDDLESEX HOSPITAL. South WEST MIDDLESEX HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER, required for Geriatric Unit. Resident or non-resident. Post offers excellent experience in general medicine.

Applications, stating age, nationality, qualifications and experience, with copies of up to 3 recent testimonials, to Group Secretary, West Middlesex Hospital, Isleworth, Middlesex, by 19th July, 1955.

ISLEWORTH. WEST MIDDLESEX HOSPITAL. South WEST MIDDLESEX HOSPITAL MANAGEMENT COMMITTEE. Pre-registration HOUSE OFFICER required for Orthopædic Unit. Post recognised for F.R.C.S. Resident.

Applications, stating age, nationality, qualifications obtained with copies of up to 2 recent testimonials, to Group Secretary, West Middlesex Hospital, Isleworth, Middlesex, by 19th July, 1955.

LEAMINGTON SPA. WARNEFORD GENERAL HOSPITAL. (207 Beds.) HOUSE SURGEON (obstetrics and gynæcology), pre-registration post. Post vacant 22nd July, 1955. Recognised for D.Obst.R.C.O.G.

Apply Hospital Secretary.

LEEDS, 7. CHAPEL ALLERTON HOSPITAL. (256 Beds.) MEDICAL REGISTRAR required for whole-time duty. National Health Service terms and conditions of service.

Detailed applications (9 copies), giving nationality, date of birth, qualifications and experience, including present appointments, and the names of 3 referees, should reach Ministry of Health, Hospital Management Branch, Norcross, Blackpool, Lancashire, by 30th July, 1955.

LEEDS, 7. CHAPEL ALLERTON HOSPITAL. (256 Beds.) REGISTRAR (general surgery and orthopædics) required for whole-time duty. National Health Service terms and conditions of service.

Detailed applications (9 copies), giving nationality, date of birth, qualifications and experience, including present appointments, and the names of 3 referees, should reach Ministry of Health, Hospital Management Branch, Norcross, Blackpool, Lancashire, by 30th July, 1955.

LEEDS. MEANWOOD PARK HOSPITAL, Tongue-lane, LEEDS, 6. (831 Beds—Mental Deficiency.) LEEDS (GROUP B) HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER (resident), required. Single accommodation available.

Application forms and further particulars from Medical Superintendent.

LEEDS, 9. ST. JAMES'S HOSPITAL. Leeds A Group HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners (Male and Female) for the appointment of SENIOR HOUSE OFFICER (orthopædics). The appointment, which is recognised by the Royal College of Surgeons for Fellowship, will be for a period of 1 year and the salary will be in accordance with the agreed terms and conditions of service of hospital medical and dental staffs, namely, £745 p.a. with an appropriate deduction in respect of board, lodgings, and other services provided.

Applications, stating age, qualifications, experience, &c., together with the names of 2 referees, to be forwarded to the undersigned as soon as possible.

J. FOLKARD, Secretary to the Committee.

Administrative Offices, St. James's Hospital, Leeds, 9.

LEICESTER GENERAL HOSPITAL (454 Beds) and ROYAL INFIRMARY (492 Beds). SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time NON-RESIDENT REGISTRAR (paediatrics) required from 1st September. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 18th July, 1955, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

LENNOXTOWN, STIRLINGSHIRE. LENNOX CASTLE MATERNITY HOSPITAL. Applications are invited from suitably qualified medical practitioners for the appointment of RESIDENT SENIOR HOUSE OFFICER in Obstetrics and Gynæcology at the above Hospital (160 Beds). The appointment will be for 6 months in the first instance and will be subject to the National Health Service (Scotland) superannuation regulations.

Applications (3 copies), stating age, qualifications, experience and present appointment, together with names of 3 referees, to be submitted not later than 18th July, 1955, to the Secretary, Board of Management, Lennox Castle, 113, Douglas-street, Glasgow, C.2.

LEIGH INFIRMARY, Leigh, Lancashire. House Surgeon (pre-registration post).

Applications to Secretary, Wigan and Leigh Hospital Management Committee, Knowsley House, Wigan.

LINCOLN. BRACEBRIDGE HEATH HOSPITAL. (For Mental Diseases—1290 Beds.) Applications are invited for the appointment of a JUNIOR HOSPITAL MEDICAL OFFICER (resident or non-resident. Male or Female—married or single). Salary and terms of service as laid down by the Ministry of Health. There is residential accommodation for a single or married officer. There will be scope for learning the use of modern psychiatric methods in the wards. Previous psychiatric experience is not essential. The appointment is subject to the provisions of the National Health Service superannuation regulations.

Applications, with names of 2 referees, should be forwarded as soon as possible to the Medical Superintendent, Bracebridge Heath Hospital, near Lincoln.

LINCOLN COUNTY HOSPITAL. (200 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER in Surgery and E.N.T., vacant 1st August, 1955. The post is recognised for D.L.O.

Applications, together with names for reference, should be forwarded to R. W. HOWICK, Group Secretary.

LINCOLN. COUNTY HOSPITAL. (200 Beds.) Applications are invited from pre-registration candidates for an appointment as HOUSE SURGEON in General Surgery for 6 months to be followed, if satisfactory, by an appointment as House Physician for a further 6 months. The House Surgeon post is recognised for F.R.C.S.

Apply, giving full particulars, to—
R. W. HOWICK, Group Secretary.

LINCOLN. ST. GEORGE'S HOSPITAL. Lincoln No. 1 HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER at the above Hospital. The duties are mainly medical but include assisting in the care of surgical and geriatric patients. Married accommodation is available.

Applications, giving full particulars together with 3 names for reference, should be addressed to—
R. W. HOWICK, Group Secretary.
County Hospital, Lincoln.

LIVERPOOL, 6. NEWSHAM GENERAL HOSPITAL, Belmont-road. (1304 Beds.) Applications are invited from registered medical practitioners (Male or Female) for the appointment of JUNIOR HOSPITAL MEDICAL OFFICER or SENIOR HOUSE OFFICER for duties in the admission-room. The post may be resident or non-resident, and the grading will be according to the qualifications and experience of the applicant appointed.

Applications should be forwarded to the Physician-Superintendent at the Hospital within 10 days of this advertisement.

LLANELLY HOSPITAL, Llanelly, Carmarthenshire. GLANTAWE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the non-resident appointment of SENIOR HOUSE OFFICER in the Casualty Department of the above Hospital.

Full particulars, stating age, experience and qualifications together with copies of 2 recent testimonials, should be forwarded to the Hospital Secretary.

LLANELLY HOSPITAL, Llanelly, Carmarthenshire. GLANTAWE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of JUNIOR HOSPITAL MEDICAL OFFICER for work in the Surgical Unit of 75 Beds. The post offers excellent experience in general surgery and the Hospital is recognised under the F.R.C.S. regulations. The successful candidate will also be expected to participate in the general work of the Hospital.

Full particulars, stating age, experience and qualifications, together with copies of 2 recent testimonials, should be forwarded to the Hospital Secretary.

LUTON AND DUNSTABLE HOSPITAL, CHILDREN'S ANNEXE, LUTON, BEDS. RESIDENT PÆDIATRIC HOUSE OFFICER required 1st August, 1955. The post is recognised for the D.C.H., and as a second pre-registration post in medicine. The duties will cover both medical and surgical wards.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 recent testimonials, to be sent as soon as possible to the Secretary, Luton and Hitchin Group Hospital Management Committee, St. Mary's Hospital, Luton, Beds.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (141 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the pre-registration post of HOUSE SURGEON. 6 months appointment. Salary at the rate of £425, £475–£525 according to experience. A deduction at the rate of £125 a year is made in respect of board and lodging and other services provided.

Applications should be forwarded as soon as possible to the Administrative Officer at the Hospital.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (141 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of RECEIVING ROOM OFFICER. Salary £745 a year, with a deduction of £150 a year for residential emoluments.

Applications to the Administrative Officer at the Hospital as soon as possible.

MACCLESFIELD HOSPITAL. Macclesfield and District HOSPITAL MANAGEMENT COMMITTEE. Applications invited for SENIOR HOUSE OFFICER ANÆSTHETIST. Main duties Infirmary Branch. Hospital recognised F.F.A.R.C.S. and D.A. purposes. Medical Library available. Post may be considered non-resident.

Apply immediately to Group Secretary, "Willerby House," Cumberland-street, Macclesfield.

MACCLESFIELD. PARKSIDE MENTAL HOSPITAL. (1647 Beds.) Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER (psychiatric). Accommodation available for a married or a single person. The appointment in the first place will be for a period of 4 years but reapplication may be made by the successful applicant at the end of this period. Facilities for attending the course for the D.P.M. at Manchester University will be granted and the Hospital is recognised by the Conjoint Board for the purpose of the D.P.M.

Applications, with the names of 3 referees, to be sent to the Medical Superintendent by 14th July, 1955.

MAIDENHEAD HOSPITAL, St. Luke's-road, Maidenhead. Applications invited for post of HOUSE SURGEON vacant July. Preference given to persons seeking pre-registration post.

Applications, stating age, nationality and qualifications, with names of 3 referees, to Hospital Secretary.

MANCHESTER, 20. WITHINGTON HOSPITAL. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for 3 posts of SENIOR HOUSE OFFICER (surgical) including casualty duties, becoming vacant late August and September, 1955. The posts are recognised by the Royal College of Surgeons for the Final F.R.C.S. examination and possession of the primary F.R.C.S. will be an advantage. The Hospital is recognised by the Manchester University for the teaching of undergraduate surgical students.

Applications, stating age, qualifications, nationality, present post, experience, and names of 2 referees, to be forwarded to the Group Secretary at the Hospital as soon as possible.

MANCHESTER, 20. WITHINGTON HOSPITAL. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER to the Geriatric Department which will become vacant in August (resident or non-resident). Duties are primarily in the active medical wards. Excellent experience is available in the unit which has been developed on modern lines and has available full general hospital facilities.

Applications, stating age, qualifications, present post, experience and the names of 2 referees, to be forwarded to the Group Secretary at the Hospital immediately.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY, MANCHESTER, 13. RESIDENT MEDICAL OFFICER (Registrar grade) to commence as soon as possible. Whole-time resident appointment for 12 months, renewable. Applicants should have held house appointments and have had medical experience. Preference will be given to candidates holding higher qualifications. Residence charge £155 p.a.

Applications to be made on forms obtainable from the undersigned and to be returned not later than 20th July, 1955.
G. H. TAYLOR, Secretary.

MANCHESTER. WEST MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. PARK HOSPITAL, DAVYHULME. (General Hospital—433 Beds.) SENIOR HOUSE OFFICER (anæsthetics) required. Post now vacant. Hospital recognised for training for Diploma in Anæsthetics.

Forms from Secretary.

MANCHESTER REGIONAL HOSPITAL BOARD. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT REGISTRAR in Obstetrics and Gynæcology. The post is recognised for training for M.R.C.O.G. purposes and applicants should have had experience in obstetrics and gynæcology. The main duties will be at Withington Hospital, which takes part in undergraduate teaching.

Application forms may be obtained from the Group Secretary, Withington Hospital, Manchester, 20, and should be returned immediately.

MANCHESTER REGIONAL HOSPITAL BOARD. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. The Board invite applications for the post of REGISTRAR in Pathology, Group Laboratory, Withington Hospital (1092 Beds), to commence 1st August, 1955. The Laboratory is recognised for the D.Path. examination, and facilities are available for training in all branches of clinical pathology.

Applications, stating age, qualifications, experience, and the names of 2 referees, should be forwarded immediately to the Group Secretary, Withington Hospital, Manchester, 20.

MANCHESTER REGIONAL HOSPITAL BOARD. Applications are invited for the resident post of REGISTRAR attached to the E.N.T. Unit.

Applications, together with the names and addresses of 3 referees, should be addressed to the Group Secretary, Burnley and District Hospital Management Committee, Burnley General Hospital, not later than 23rd July, 1955.

MANCHESTER REGIONAL HOSPITAL BOARD invite applications for the post of REGISTRAR in Chest Diseases to the Wigan and Leigh and Wrightington Groups of hospitals. 2 busy chest clinics and opportunity to gain experience in Thoracic Surgical Unit.

Applications, together with the names of 2 referees, to the Secretary, Wigan and Leigh Hospital Management Committee, Knowsley House, Wigan, to be received not later than 14th July, 1955.

MANCHESTER REGIONAL HOSPITAL BOARD. Applications are invited for the whole-time resident post of REGISTRAR in General Surgery (recognised for F.R.C.S. (Eng.)), in the Ashton, Hyde and Glossop Group of hospitals.

Applications, stating age, nationality, qualifications, and experience, together with copies of 3 testimonials, should be forwarded to the Group Secretary, Ashton-under-Lyne General Hospital, Ashton-under-Lyne.

MANCHESTER REGIONAL HOSPITAL BOARD. Applications are invited for the post of Locum Tenens REGISTRAR or SENIOR HOUSE OFFICER in General Surgery for the month of August.

Applications should be sent as soon as possible to the Hospital Secretary, Victoria Hospital, Blackpool.

MANCHESTER REGIONAL HOSPITAL BOARD. REGISTRAR for the Geriatric Department of the Bolton and District Group of hospitals (which contains acute admission wards and has full physiotherapy, laboratory and radiological facilities) and also to assist in the supervision of the health of nurses.

Applications, stating age, nationality, qualifications, experience and the names of 2 referees, should be sent immediately to Group Secretary, Bolton and District Hospital Management Committee, The Royal Infirmary, Bolton.

MANCHESTER REGIONAL HOSPITAL BOARD. SURGICAL REGISTRAR (Resident Surgical Officer), post vacant Rochdale Infirmary 1st October 1955.

Apply at once to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale.

NEWCASTLE GENERAL HOSPITAL. (838 Beds.) NEWCASTLE UPON TYNE HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER in the Urology Unit (51 Beds). Applications are invited for this vacancy. The Department is a self-contained unit and the Regional Urological Centre. The post offers excellent opportunities for gaining practical experience under Consultant Urological Surgeons.

Applications, together with 1 copy of 2 recent testimonials, should be addressed to the Secretary, Newcastle General Hospital, Newcastle upon Tyne, 4.

NEWCASTLE REGIONAL HOSPITAL BOARD.

Newcastle General Hospital

REGISTRAR PÆDIATRICIANS (2) whole-time. Children's Department closely associated with University Department of Child Health. Persons appointed to take part in teaching; also to take periods of duty in care of infants in Maternity Department and also at the Hospital for Sick Children. Appointments to commence 1st October and 25th October, 1955.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, "Blythswood South," Osborne-road, Newcastle upon Tyne, 2, within 28 days.

South West Durham Hospital Management Committee

REGISTRAR PHYSICIAN (whole-time), Bishop Auckland General Hospital (300 Beds). Married or single accommodation available.

Regional Thoracic Service

REGISTRAR THORACIC SURGEON (whole-time) at Regional Centre (160 Beds), Shotley Bridge General Hospital. Work almost entirely non-tuberculosis (cardiovascular, œsophageal and pulmonary) and at associated sanatoria. Higher qualification necessary and some experience in chest surgery an advantage. Appointment intended for trainee in thoracic surgery.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, "Blythswood South," Osborne-road, Newcastle upon Tyne, 2, within 7 days.

NEWCASTLE UPON TYNE HOSPITAL MANAGEMENT COMMITTEE. WALKER GATE HOSPITAL. (326 Beds.) Applications are invited from registered medical practitioners for the post of SENIOR HOUSE OFFICER for duties concerned with pædiatric and fever cases. It will be desirable for candidates to have had experience in the specialties mentioned. Unfurnished house available if desired. Salary in accordance with the National Health Service terms and conditions of service.

Applications, with testimonials or the names of 2 referees, to be sent to the Secretary, Walker Gate Hospital, Benfield-road, Newcastle upon Tyne, 6.

NEWMARKET GENERAL HOSPITAL, Newmarket, SUFFOLK. SENIOR HOUSE SURGEON (Senior House Officer grade). Tenable for 6 months in first instance. Duties mainly surgical, but a small amount of E.N.T. and ophthalmic surgery is included. Preference to candidates who wish to be trained in surgical technique and to gain experience in operative surgery.

Applications, with copies of 3 testimonials, to Physician-Superintendent.

NORTH GLOUCESTERSHIRE CLINICAL AREA. SOUTH-WESTERN REGIONAL HOSPITAL BOARD. Applications are invited from registered medical practitioners for the appointment of LOCUM TENENS in the Registrar grade in the Department of Orthopædic and Traumatic Surgery in the North Gloucestershire Clinical Area based at the Gloucestershire Royal Hospital, Gloucester, for a period of 2–3 months commencing 19th July, 1955.

Applications, stating age, qualifications and experience, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8.

NORWICH. NORFOLK AND NORWICH HOSPITAL. JUNIOR CASUALTY OFFICER required, post vacant 1st August. 2 Casualty Officers employed in department. Recognised for Final F.R.C.S. examination requirements. This is a pre-registration post, and the salary is £425, £475, or £525 p.a., according to experience, less £125 p.a. for residential emoluments.

Applications, stating age, qualifications and experience, with names of 2 referees, to be sent to Group Secretary, Hospital Management Committee, St. Stephen's-road, Norwich.

NORWICH. NORFOLK AND NORWICH HOSPITAL. ORTHOPÆDIC HOUSE SURGEON required (House Officer or Senior House Officer status). Post vacant 1st August, 1955. Salary £745 p.a. if Senior House Officer, less £150 for full residential emoluments. Membership of a Medical Defence Society is a condition of appointment.

Applications, stating age, qualifications and experience, with names of 2 referees, to be sent to Group Secretary, No. 6 Group Hospital Management Committee, St. Stephen's-road, Norwich.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOSPITAL. (555 Beds.) NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR required in the X-ray Diagnostic Department at above Hospital for 1 year in first instance.

Application forms obtainable from, and returnable to, the Secretary, Harefield and Northwood Group Hospital Management Committee, Mount Vernon Hospital, Northwood, Middlesex. Hospital may be visited by direct appointment.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOSPITAL. Applications are invited for the post of HOUSE SURGEON to the Radiotherapy and E.N.T. Departments. This post is recognised as a pre-registration appointment.

Applications, accompanied by 2 testimonials, should be forwarded to the Resident Medical Officer, Mount Vernon Hospital, Northwood, by 26th July, 1955.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOSPITAL. Applications are invited for the post of HOUSE PHYSICIAN to the Radiotherapy Department. This post is recognised as a pre-registration appointment.

Applications, accompanied by 2 testimonials, should be forwarded to the Resident Medical Officer, Mount Vernon Hospital, Northwood, by 26th July, 1955.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOSPITAL. Applications are invited for the post of HOUSE SURGEON for General Surgery and Orthopædic Surgery. Recognised for the Final F.R.C.S. in General Surgery, and recognised as a pre-registration appointment.

Applications, accompanied by 2 testimonials, to be forwarded to the Resident Medical Officer, Mount Vernon Hospital, Northwood, by 26th July, 1955.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOSPITAL. Applications are invited for the post of HOUSE SURGEON to the Gynæcological Department of 25 Beds. This appointment is recognised for the M.R.C.O.G., and may be a pre-registration appointment.

Applications, accompanied by 2 testimonials, should be forwarded to the Resident Medical Officer, Mount Vernon Hospital, Northwood, by 26th July, 1955.

NOTTINGHAM AND MIDLAND EYE INFIRMARY. Required, 2 SENIOR HOUSE OFFICERS, duties to commence immediately and 31st July. Salary and conditions of service in accordance with Ministry regulations.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to the Group Secretary, General Hospital, Nottingham.

NOTTINGHAM CHILDREN'S AND CITY HOSPITALS. (880 Beds.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (pædiatrics) required. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 18th July, 1955, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

NOTTINGHAM. CITY HOSPITAL. (804 Beds.) Applications are invited for 2 posts of HOUSE PHYSICIAN, vacant 19th August and 1st September, respectively. Recognised for for pre-registration purposes.

Applications, stating age, nationality, qualifications, and experience, together with copies of not more than 3 testimonials, to be sent immediately to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

NOTTINGHAM. CITY HOSPITAL. (804 Beds.) Applications are invited for the post of HOUSE SURGEON, vacant 1st September, 1955. Recognised for pre-registration purposes.

Applications, stating age, nationality, qualifications and experience, together with copies of not more than 3 testimonials, to be sent to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

NOTTINGHAM GENERAL HOSPITAL. Hogarth Radiotherapy Centre. A vacancy exists at the above Centre for a SENIOR HOUSE OFFICER in Radiotherapy or REGISTRAR (if in possession of Part I, D.M.R.T.) in Radiotherapy. The Centre is recognised as a Training School for both Part I and II D.M.R.T. (Royal Colleges of London) in conjunction with the University of Nottingham, and instruction for this examination can be given to those interested and suitable. The position offers excellent experience for persons studying for other post-graduate degrees.

Apply as soon as possible, stating age, qualifications and experience, together with names of 3 referees, to the Group Secretary, General Hospital, Nottingham.

NOTTINGHAM GENERAL HOSPITAL. Applications are invited for the post of RESIDENT SENIOR ANÆSTHETIC HOUSE OFFICER, vacant now. The post is recognised for the D.A. and the F.F.A. R.C.S. This is a busy general hospital, giving experience in all branches of surgery.

Applications, stating age, nationality and qualifications, together with copies of testimonials, to be sent to the Group Secretary.

NOTTINGHAM GENERAL HOSPITAL. E.N.T. Department. Applications are invited for the post of SENIOR E.N.T. HOUSE OFFICER for the above Hospital. This appointment is recognised for the D.L.O. and the F.R.C.S. examinations. Salary and conditions of service in accordance with Ministry regulations. Duties to commence as soon as possible. Although the post is normally resident, consideration will be given to any applicant who desires to live out.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to the Group Secretary, General Hospital, Nottingham.

NOTTINGHAM. HIGHBURY HOSPITAL. Applications are invited for post of SENIOR HOUSE OFFICER in Obstetrical and Gynæcological Department, Highbury Hospital, 121, Highbury-road, Bulwell, Nottingham.

Apply Secretary.

OXFORD REGIONAL HOSPITAL BOARD. Senior REGISTRAR to the Department of Medicine, Reading Group of hospitals. Appointment for 1 year in the first instance, eligible for extension up to 4 years. A higher medical qualification is desirable. Candidates are invited to visit the hospitals by arrangement with the Group Secretary.

Applications on forms obtainable from the Secretary, Joint Committee for Senior Registrars, 43, Banbury-road, Oxford, to reach him by 23rd July.

OXFORD REGIONAL HOSPITAL BOARD. Whole-time REGISTRAR in Obstetrics and Gynæcology to the hospitals of the Swindon area. The appointment will be for 1 year and eligible for extension to 2 years.

Forms, obtainable from the Secretary, Registrar Committee, 43, Banbury-road, Oxford, must reach him by 23rd July.

OXFORD. UNIVERSITY OF OXFORD. OXFORD REGIONAL HOSPITAL BOARD. SENIOR REGISTRAR in Psychiatry at the Warneford Hospital, Oxford. Appointment for 1 year in the first instance, renewable annually for 4 years. The successful applicant may be able to transfer to St. John's Hospital, near Aylesbury, for the second half of the appointment. Applicants should hold the D.P.M. Married quarters available at both hospitals.

Applications, on forms obtainable from the Secretary, Registrar Committee, 43, Banbury-road, Oxford, should reach him by 30th July.

OTLEY, YORKSHIRE. THE GENERAL HOSPITAL. ILKLEY AND OTLEY HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the post of SENIOR HOUSE OFFICER in General and Orthopædic Surgery. 50 surgical beds in a 170-Bedded Hospital with full Consultant staff who are members of the Teaching Staff of Leeds University. Duties to commence as soon as possible.

Applications, stating full particulars of age, nationality and experience, together with the names of 2 referees, to the undersigned as soon as possible. E. W. BEST, Group Secretary.

PETERBOROUGH. THE MEMORIAL HOSPITAL. PETERBOROUGH AND STAMFORD HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the position of HOUSE SURGEON, which will be vacant on 18th July, 1955.

Applications, with testimonials, should be addressed to the Secretary, Memorial Hospital, Peterborough.

PETERBOROUGH. THE MEMORIAL HOSPITAL. PETERBOROUGH AND STAMFORD HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the position of SENIOR HOUSE OFFICER (orthopædic), vacant now. Exceptional experience offered in busy department.

Apply to the Secretary, Memorial Hospital, Peterborough.

PLYMOUTH. SCOTT ISOLATION HOSPITAL. House PHYSICIAN (resident, Male) post vacancy 1st August, 1955. Recognised pre-registration post which offers excellent experience.

Applications should be sent to the Group Secretary, Plymouth Special Hospital Management Committee, 8, Nelson-gardens, Stoke, Plymouth.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL.

SENIOR HOUSE OFFICER in Surgery, Greenbank Road Section, vacant 1st August, 1955. Recognised for the F.R.C.S.

SENIOR HOUSE OFFICER in Surgery, Devonport Section, vacant 21st August, 1955. Recognised for the F.R.C.S.

SENIOR HOUSE OFFICER to Casualty and Traumatic Department, Freedom Fields Section, vacant 3rd August, 1955.

HOUSE OFFICER in Obstetrics, Alexandra Maternity Home, vacant immediately.

Applications, stating age, nationality, qualifications and experience, with names of 3 referees, to be sent to—

ARTHUR R. CASH, Group Secretary, Plymouth,
South Devon and East Cornwall General Hospital Group.
7, Nelson-gardens, Stoke, Plymouth.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL. SENIOR HOUSE OFFICER in Anæsthetics, vacant 1st September, 1955, recognised for the D.A., and Fellowship. This appointment will be for a period of 12 months.

Applications, stating age, nationality, qualifications and experience, with names of 3 referees, to be sent to—

ARTHUR R. CASH, Group Secretary, Plymouth,
South Devon and East Cornwall General Hospital Group.
7, Nelson-gardens, Stoke, Plymouth.

PLYMOUTH, SOUTH DEVON AND EAST CORNWALL GENERAL HOSPITAL GROUP. AREA PATHOLOGICAL DEPARTMENT. Applications invited from duly qualified and registered medical practitioners for the appointment of RESIDENT SENIOR HOUSE OFFICER in Pathology, vacant 1st September, 1955. The appointment will be for a period of 12 months, in the Area Laboratory at the South Devon and East Cornwall Hospital, Greenbank-road, Plymouth, which provides excellent modern working facilities.

Applications, stating age, nationality, qualifications, and experience, together with the names and addresses of 3 referees, to be sent to ARTHUR R. CASH, Group Secretary.
7, Nelson-gardens, Stoke, Plymouth.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE.

Royal Portsmouth Hospital

HOUSE OFFICER for pædiatric and medical beds—total 30. Pre-registration post. Vacant 16th July, 1955.
HOUSE SURGEON (70 surgical beds), vacant 1st August. Pre-registration post.
HOUSE PHYSICIAN (65 medical beds), vacant 17th August. Pre-registration post.

St. Mary's Hospital (74 medical and 107 surgical beds)

HOUSE PHYSICIAN, vacant 31st July. Pre-registration post.
HOUSE PHYSICIAN, vacant 5th August. Pre-registration post.
HOUSE PHYSICIAN, vacant 24th August. Pre-registration post.
HOUSE SURGEON, vacant 25th July. Pre-registration post.
HOUSE SURGEON, vacant 26th July. Pre-registration post.
HOUSE SURGEON, vacant 31st July. Pre-registration post.

Applications, stating age, experience and qualifications, together with names of 2 referees, should be forwarded as soon as possible to L. C. ROGERS.
35, Grove-road South, Southsea.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE.

Queen Alexandra Hospital

SENIOR HOUSE OFFICER required for the Gynæcological Department of the Group for duties at the above Hospital. 40 gynæcological beds. Recognised for M.R.C.O.G. Vacant now.

Applications, stating age, experience, and qualifications, together with names of 2 referees, should be forwarded as soon as possible to L. C. ROGERS.
35, Grove-road South, Southsea.

READING. ROYAL BERKSHIRE HOSPITAL. (401 Beds.) Applications are invited from registered medical practitioners only for the resident post of JUNIOR HOUSE SURGEON (gynæcology), vacant immediately and tenable for 6 months.

Write, stating age, qualifications with dates, nationality, present post, with copy of 1 recent testimonial, to the Secretary.

READING. ROYAL BERKSHIRE HOSPITAL. (401 Beds.) Applications are invited from registered medical practitioners for the appointment of SENIOR RESIDENT ANÆSTHETIST, vacant 20th July, for period of 1 year, F.F.A.R.C.S. recognised. Salary £745 p.a., less £125 p.a. board-residence.

Write, stating age, qualifications with dates, nationality and present post, with copy of 1 recent testimonial, to Secretary.

ROCHDALE AND DISTRICT HOSPITAL MANAGE-MENT COMMITTEE. HOUSE OFFICER (surgery). Post now vacant at Birch Hill Hospital. Pre-registration candidates eligible for this post which is recognised for 6 months F.R.C.S. experience.

Apply at once to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) SENIOR HOUSE OFFICER (resident) required from 1st August, 1955, for duties in the Casualty and Admissions Department. This is a large General Hospital with specialised departments dealing with all types of acute medical and surgical cases. The post affords good opportunity for gaining tuition and experience.

Applications should be addressed to the Group Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford, as soon as possible.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) ORTHOPÆDIC HOUSE SURGEON (resident) required in the Orthopædic and Accident Unit from 8th August, 1955. The service consists of 100 Beds equally divided between traumatic surgery and "cold" orthopædics. Post is recognised for pre-registration purposes and for F.R.C.S.

Applications to be sent to Group Secretary, Romford Hospital Management Committee, Oldchurch Hospital, as soon as possible.

ROMFORD, ESSEX. RUSH GREEN HOSPITAL. (301 Beds.) RESIDENT SENIOR HOUSE OFFICER in Anæsthetics (Male or Female) required from 20th August, 1955. Post affords good experience; modern equipment. Recognised for D.A. and F.F.A.R.C.S.

Applications to Medical Superintendent. Hospital may be seen by arrangement (Tel. Romford 7711).

ROMFORD, ESSEX. RUSH GREEN HOSPITAL. (301 Beds.) RESIDENT HOUSE OFFICER (general surgery) required from 14th August, 1955. Post is recognised for pre-registration purposes and for F.R.C.S.

Applications should be forwarded immediately to Medical Superintendent stating also names of 2 referees.

SALFORD ROYAL HOSPITAL. Salford Hospital MANAGEMENT COMMITTEE. Applications invited for the appointment of SENIOR HOUSE OFFICER (Orthopædic and Casualty Departments), resident. Post vacant August. Recognised for F.R.C.S. gives opportunity for experience in emergency surgery. Salary subject to deduction of £140 p.a. for board and lodging.

Applications, with copies of 3 testimonials, should be sent to the Secretary, Salford Royal Hospital, Chapel-street, Salford, 3.

SALFORD ROYAL HOSPITAL, Chapel-street, Salford, 3. SALFORD HOSPITAL MANAGEMENT COMMITTEE. Applications invited for post of SENIOR HOUSE OFFICER (Urological Department). The position, offering wide experience in urology, is recognised for F.R.C.S. and tenable for 6 or 12 months (vacant mid-July). Charge of £140 p.a. made for board and lodging.

Applications to Secretary.

SALFORD, 5, LANCASHIRE. LADYWELL HOSPITAL. SALFORD HOSPITAL MANAGEMENT COMMITTEE. Applications invited for post of JUNIOR HOSPITAL MEDICAL OFFICER. Duties mainly in Tuberculosis Unit, but successful applicant will also be engaged on geriatric and acute infectious disease wards. Post offers opportunities for study and access to other hospitals within the Group. Salary in accordance with scale. A deduction of £140 p.a. will be made for cost of board-residence.

Applications, stating age, qualifications and experience, together with the names of 2 referees, should be submitted immediately to the Hospital Secretary.

SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time NON-RESIDENT SENIOR REGISTRAR in Anæsthetics required within the Nottingham Group of hospitals with duties mainly at Nottingham City Hospital. A Plastic Surgery Unit has been established at Nottingham City Hospital and experience in this type of work would be an advantage. Appointment for 1 year in first instance, reviewable annually. It has been agreed between the Sheffield Regional Hospital Board and the Board of Governors of the United Sheffield Hospitals that, subject to satisfactory work and progress, the tenure of the appointment will be divided between the Nottingham No. 2 Hospital Management Committee Group of Hospitals and 1 of the Teaching Hospitals.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 18th July, 1955, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time SENIOR ORTHOPÆDIC REGISTRAR (transitional appointment) required for 1 year in first instance at the Doncaster Royal Infirmary. Applications invited from Senior Orthopædic Registrars in their fourth or subsequent years and from those who held such posts for 3 years or more but vacated them after 1st January, 1951.

Applications, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees, should be sent to the Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, to arrive not later than 18th July, 1955.

SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time NON-RESIDENT SENIOR SURGICAL REGISTRAR required for Leicester Royal Infirmary. Possession of higher surgical qualification desirable. Appointment for 1 year in first instance, reviewable annually. It has been agreed between the Sheffield Regional Hospital Board and the Board of Governors of the United Sheffield Hospitals, that, subject to satisfactory work and progress, the tenure of the appointment will be divided between the Leicester Royal Infirmary and 1 of the Teaching Hospitals.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 25th July, 1955, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. ROYAL INFIRMARY UNIT. Applications invited for the non-resident post of OPHTHALMIC REGISTRAR at the above Hospital.

Applications, stating age, qualifications and experience, with names of 3 referees, should be sent immediately to the Chief Administrative Officer, The United Sheffield Hospitals, West-street, Sheffield, 1.

SALISBURY GENERAL HOSPITAL. Salisbury Group HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of RESIDENT HOUSE SURGEON/HOUSE PHYSICIAN to run consecutively in this order from 19th August, 1955, for a period of 6 months in each post. The post is open to pre-registration candidates.

Apply, naming 2 referees, to Group Secretary, Odstock Hospital, Salisbury.

SALISBURY GENERAL HOSPITAL. Salisbury Group HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE OFFICER to the E.N.T. Department. Post is recognised for D.L.O. and F.R.C.S. and is vacant September, 1955.

Applications, naming 2 referees, to Group Secretary, Odstock Hospital, Salisbury, Wilts.

SALISBURY GENERAL HOSPITAL. Salisbury Group HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of REGISTRAR to the Orthopædic Department at above Hospital with effect from 1st October.

Applications forms may be obtained from, and must be returned to, Group Secretary, Odstock Hospital, Salisbury, by 30th July.

SCOTLAND. EASTERN REGIONAL HOSPITAL BOARD. RADIODIAGNOSIS. DUNDEE TEACHING HOSPITALS. Applications are invited for an appointment as SENIOR REGISTRAR in Radiodiagnosis at Dundee Royal Infirmary (510 Beds) and Maryfield Hospital, Dundee (400 Beds) both general teaching hospitals associated with the University of St. Andrews. Possession of the Diploma in Radiology is essential. A new Radiodiagnostic Department at Dundee Royal Infirmary is expected to be in operation shortly. Salary and conditions of service in accordance with national agreement.

Forms of application and further particulars from the Secretary to the Board, 430, Blackness-road, Dundee, with whom applications must be lodged not later than 16th July, 1955.

SCOTLAND. NORTH-EASTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of SENIOR REGISTRAR in General Surgery with an interest in Pædiatric Surgery—main duties in Aberdeen Special Hospitals. Appointment is for a period of 1 year and may be extended.

Applications, giving 2 names for reference, should be submitted by 30th July, 1955, to the Secretary, 1, Albyn-place, Aberdeen, from whom further particulars may be obtained.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointments of 2 REGISTRARS in Pathology based at the Western Infirmary, Glasgow, which will be for 1 year in the first instance. These appointments are subject to the National Health Service (Scotland) superannuation regulations.

Applications (12 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, by 30th July, 1955.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of REGISTRAR in E.N.T. Surgery at the Western Infirmary, with duties at a later date at the Ear, Nose and Throat Hospital, Glasgow, which will be for 1 year in the first instance. This appointment is subject to the National Health Service (Scotland) superannuation regulations.

Applications (12 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, by 30th July, 1955.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the post of SENIOR HOUSE OFFICER in Anæsthetics at Stobhill Hospital, Glasgow. The appointment will be for 1 year in the first instance.

Applications, stating age, qualifications, experience, and present appointment, and naming 3 referees, to be lodged with the Secretary, Board of Management for Glasgow Northern Hospitals, 13, Woodside-place, Glasgow, C.3, by 20th July, 1955.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the following appointments, which will be for 1 year in the first instance :—

REGISTRAR in Surgery based at the Royal Alexandra Infirmary, Paisley.

REGISTRAR in Tuberculosis based at Ruchill Hospital, Glasgow.

These appointments are subject to the National Health Service (Scotland) superannuation regulations.

Applications (12 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, by 25th July, 1955.

SHREWSBURY HOSPITAL GROUP. Registrar in E.N.T. Surgery. Duties—E.N.T. Hospital, Shrewsbury (68 Beds), and Copthorne Hospital (168 Beds). Resident/non-resident. Considerable experience specialty desirable.

Application forms from Group Secretary, Royal Salop Infirmary, Shrewsbury, to be returned before 16th July, 1955. Candidates may visit hospitals.

SHREWSBURY. ROYAL SALOP INFIRMARY/COPTHORNE HOSPITAL. (500 Beds.) HOUSE PHYSICIAN, for Pre-registration Service, vacant 1st August, 1955.

Applications, with copy testimonials, to Group Secretary, Royal Salop Infirmary, Shrewsbury.

SHREWSBURY. ROYAL SALOP INFIRMARY, CHILDREN'S UNIT, SHREWSBURY HOSPITAL GROUP, SENIOR HOUSE OFFICER or HOUSE OFFICER (pædiatric), vacant immediately. The Unit consists of medical, surgical and fever beds.

Applications, with copy testimonials, to Group Secretary, Royal Salop Infirmary, Shrewsbury.

SHREWSBURY. ROYAL SALOP INFIRMARY. (509 Beds.) SHREWSBURY HOSPITAL GROUP. HOUSE SURGEON required immediately. Pre-registration candidates eligible. Recognised for the F.R.C.S.

Applications, with copy testimonials, to Group Secretary, Royal Salop Infirmary, Shrewsbury.

SHREWSBURY. ROYAL SALOP INFIRMARY AND CROSS HOUSES HOSPITAL. OBSTETRIC UNIT. SHREWSBURY HOSPITAL GROUP. 2 OBSTETRIC HOUSE SURGEONS. Duties to rotate between the 2 hospitals. Pre-registration posts. Vacant immediately.

Applications, with copy testimonials, to Group Secretary, Royal Salop Infirmary, Shrewsbury.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. WINDSOR GROUP HOSPITAL MANAGEMENT COMMITTEE. Locum SENIOR SURGICAL REGISTRAR required 20th August–10th September. Person appointed may be required to do emergency work at other hospitals within the Group.

Applications, together with copies of 3 testimonials, to Hospital Secretary.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. HOUSE OFFICER (casualty) required, 1 of 2, for busy Casualty Department. Experience provided in orthopædic and plastic cases.

Applications, stating age and qualifications, with copies of 2 testimonials, to Hospital Secretary.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. WINDSOR GROUP HOSPITAL MANAGEMENT COMMITTEE. HOUSE PHYSICIAN required for post vacant 6th August. This is a pre-registration appointment and offers considerable experience in general acute and medical work.

Applications, together with copies of 2 recent testimonials, to Hospital Secretary, not later than 20th July.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. Locum required for Pre-registration HOUSE PHYSICIAN post for 28th July–11th August.

Applications, with copies of 2 recent testimonials, to Hospital Secretary.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as Whole-time REGISTRAR in General Surgery to fill a vacancy in the approved trainee establishment at the Medway and Gravesend Group of hospitals. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications, and experience with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, London, W.1, not later than 23rd July, 1955.

SOUTHEND-ON-SEA HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the appointment of CLINICAL ASSISTANT to the Ophthalmic Department for an average of 5 sessions per week to be undertaken at the General Hospital, Southend (2 sessions per week), and at the Children's Ophthalmic Clinics held on local authority premises in the surrounding district (average 3 sessions per week). Previous experience in hospital ophthalmic work essential. Payment will be at the rate of £175 p.a. per weekly 3½-hour notional half-day. Appointment tenable for 1 year, renewable. Duties to commence 1st August, 1955.

Applications, stating age, qualifications and experience, with names of 2 referees, to be sent to the undersigned to arrive not later than 16th July, 1955. J. C. FIELD, Secretary.

SOUTHPORT GENERAL INFIRMARY. (Recognised for F.R.C.S. and pre-registration.) HOUSE SURGEON (general surgery and ophthalmology). Post vacant late July or early August, 1955.

Apply, stating age, qualifications, experience, nationality, and enclosing 2 copy testimonials, to Group Secretary, Southport and District Hospital Management Committee, Promenade Hospital, Southport.

SOUTHAMPTON CHILDREN'S HOSPITAL. (Recognised by Conjoint Board for D.C.H.) HOUSE OFFICER required. Total establishment of 3 residents. Salary, &c., as nationally advocated.

Applications, with copies of testimonials, to be submitted immediately to the Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON EYE HOSPITAL. (32 Beds. Recognised for the D.O. examination.) RESIDENT SENIOR HOUSE OFFICER required immediately.

Applications, with copies of testimonials, should be forwarded as soon as possible to the Secretary, Southampton Group Hospital Management Committee, Bullar-street.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL. (278 Beds.) ORTHOPÆDIC HOUSE SURGEON required. Post recognised for Pre-registration Service and tenable for 6 months. This Hospital is the centre to which all trauma from a large industrial town and port is directed, thus providing excellent experience in the treatment of traumatic conditions; patients with orthopædic conditions are also drawn from a wide area.

Applications, with copies of testimonials, should be sent as soon as possible, to the Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. SENIOR HOUSE OFFICER (pædiatrics) required. Post recognised for D.C.H., vacant 1st August.

Applications, with details of previous experience, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent, as soon as possible.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. (455 Beds.) SENIOR HOUSE OFFICER (E.N.T.) required, vacant now. Recognised F.R.C.S.

Applications to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent, as soon as possible.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. (455 Beds.) SENIOR HOUSE OFFICER (ophthalmology) required. Recognised F.R.C.S. and D.O.

Applications to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. (455 Beds.) HOUSE OFFICER (general surgery) required, vacant July. Recognised F.R.C.S. and pre-registration.

Applications to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. (455 Beds.) SENIOR HOUSE OFFICER in Orthopædics. Recognised F.R.C.S.

Applications (2 references) to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT (near). GROUNDSLOW HOSPITAL, TITTENSOR. RESIDENT ASSISTANT MEDICAL OFFICER required. Hospital of 110 Beds (male and female) for pulmonary tuberculosis. Post vacant mid-November. Junior Hospital Medical Officer status. House available.

Applications to Group Secretary, Stafford Hospital Management Committee, 13, Foregate-street, Stafford.

SWANSEA. MOUNT PLEASANT HOSPITAL. GLANTAWE HOSPITAL MANAGEMENT COMMITTEE. Registered medical practitioners are invited to apply for the resident appointment of JUNIOR HOSPITAL MEDICAL OFFICER (Female) for work in the Medical and Surgical Departments, and in the chronic sick wards of the above Hospital.

Applications, stating age, experience and qualifications, should be addressed to the Hospital Secretary.

SWINDON HOSPITAL GROUP. (507 Beds.) Applications are invited for the appointment of RESIDENT SENIOR HOUSE OFFICER as Casualty Officer and Orthopædic House Surgeon at Great Western Hospital, Swindon. Post recognised by R.C.S. for 6 months of year's training under Fellowship regulations. Work of Accident and Orthopædic Department, associated with Wingfield-Morris Orthopædic Hospital, Oxford, includes large number of industrial injuries. Salary £745 p.a., less £145 p.a. for residential emoluments.

Full details and names of 3 referees to Secretary, 7, Okus-road, Swindon, as soon as possible.

TAPLOW, near MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL. HOUSE SURGEON required for post vacant end of July. Preference given to persons seeking pre-registration post.

Applications, stating age, qualifications with dates, and 2 copies of testimonials, to Hospital Secretary.

TORQUAY. TORBAY HOSPITAL. (166 general beds.) RESIDENT HOUSE OFFICER (surgical) Male or Female, required immediately. Post recognised for F.R.C.S. and pre-registration purposes. There is a complement of 5 Resident House Officers.

Applications, stating qualifications, nationality, and age, together with copy testimonials (quoting reference F. 955/58) to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, S. Devon.

WATFORD, HERTFORDSHIRE. THE PEACE MEMORIAL HOSPITAL. (189 Beds.) Applications are invited for the post of HOUSE SURGEON (pre-registration post). Salary according to National Health Service scale.

Applications, with copies of recent testimonials, to—
CYRIL HOPKINSON, Administrator.

WATFORD. SHRODELLS HOSPITAL. (320 Beds.) Applications are invited for the post of GYNÆCOLOGICAL HOUSE OFFICER (pre- or post-registration). If held by a registered medical practitioner the post will be paid on Junior Hospital Medical Officer scale. Post vacant beginning of August.

Applications, together with copies of 2 testimonials, to reach the Medical Officer-in-charge as soon as possible.

WARRINGTON GENERAL HOSPITAL. Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER (Male or Female), Obstetrics and Gynæcology, which will become vacant on 1st October, 1955. This post is recognised for the D.Obst.R.C.O.G. Scale of salary £745 p.a., less £130 for residential emoluments.

Applications, stating age, qualifications with dates, and details of experience, together with copies of recent testimonials, should be sent to the Group Secretary, Warrington and District Hospital Management Committee, c/o General Hospital, Warrington, Lancs.

WARRINGTON GENERAL HOSPITAL. (388 Beds.) Applications are invited for 2 HOUSE SURGEONS (Male or Female), recognised for pre-registration. The posts will be vacant on 25th July, 1955, and 23rd August, 1955, respectively. Salary will be £425–£525 p.a., less a deduction of £125 for full residential emoluments. The staffing of the Surgical Unit consists of a Senior Registrar, Registrar, and 2 House Surgeons. The posts offer a comprehensive training in surgery.

Apply, giving full particulars, to—
H. L. BOOT, Group Secretary,
Warrington and District Hospital Management Committee.
c/o General Hospital, Warrington, Lancs.

WARRINGTON INFIRMARY. (172 Beds.) Applications are invited from Males or Females for the post of RESIDENT HOUSE PHYSICIAN (pre-registration or Senior House Officer) at the above Hospital. Salary will be £425–£525 p.a., less a deduction of £125 for full residential emoluments, or Senior House Officer grade—£745 p.a., less £130 for residential emoluments.

Applications should be forwarded to—
H. L. BOOT, Group Secretary,
Warrington and District Hospital Management Committee.
c/o General Hospital, Warrington, Lancs.

WELSH REGIONAL HOSPITAL BOARD. Registrar in General Medicine, based at Morriston Hospital, Morriston, near Swansea, to serve Glantawe Hospital Management Committee area. Resident. Subject to review end of first year.

Application forms from Senior Administrative Medical Officer, Temple of Peace and Health, Cathays Park, Cardiff, within 14 days.

WESTON-SUPER-MARE GENERAL HOSPITAL. (107 Beds.) Applications are invited from registered medical practitioners for the pre-registration appointment (resident) vacant 1st September, 1955, of HOUSE PHYSICIAN.

Applications, stating age, qualifications, together with names and addresses of 2 referees, should be addressed to the Secretary, Weston-super-Mare Hospital Management Committee.

WESTON-SUPER-MARE GENERAL HOSPITAL. (107 Beds.) Applications are invited from registered medical practitioners for the pre-registration appointment (resident) vacant 1st August, 1955, of HOUSE SURGEON.

Applications, stating age, qualifications, together with names and addresses of 2 referees, should be addressed to the Secretary, Weston-super-Mare Hospital Management Committee.

WIGAN. ROYAL ALBERT EDWARD INFIRMARY. 2 HOUSE SURGEONS (pre-registration posts). Recognised F.R.C.S.

Applications, with names of 2 referees, to Secretary, Wigan Infirmary.

WOLVERHAMPTON GROUP.

The Royal Hospital (an Associated Hospital of the University of Birmingham Medical School)
*HOUSE OFFICER (general surgery), vacant now.
HOUSE OFFICER (E.N.T. Department), vacant 17th July.

Women's Branch
*HOUSE OFFICER (gynæcological and obstetric), vacant 24th July. Appointment recognised for M.R.C.O.G.
*Approved for Pre-registration Service.

Apply, with copies of testimonials, to Secretary, The Royal Hospital, Wolverhampton.

WORKINGTON INFIRMARY, Cumberland. (118 Beds. Pre-registration post, recognised F.R.C.S. (Ed.).) HOUSE SURGEON (first, second, or Senior House Officer post), vacant middle of August.

Detailed applications, with dates and copies of 2 testimonials, to Secretary.

WREXHAM (near). TREVALYN MANOR MATERNITY HOSPITAL, ROSSETT. (47 Beds.) Applications are invited for the post of HOUSE SURGEON at the above Hospital to commence immediately. The Hospital is recognised by Central Midwives Board as a Part II Midwifery Training School and deals with normal and abnormal midwifery.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, to be sent to the Group Secretary, Maelor General Hospital, Wrexham, as soon as possible.

WREXHAM. MAELOR GENERAL HOSPITAL. (591 Beds.) Applications are invited for the post of HOUSE SURGEON at the above Hospital, to commence duties at the beginning of August. The appointment is recognised for the Diploma of F.R.C.S. (Eng. and Edin.) and is a pre-registration post.

Applications, stating age, nationality, qualifications and experience, with copies of 2 recent testimonials, to be sent to the Group Secretary, Maelor General Hospital, Wrexham, as soon as possible.

WREXHAM. WAR MEMORIAL HOSPITAL. (230 Beds.) Applications are invited for the post of HOUSE SURGEON at the above Hospital, to commence duties at the beginning of August. The appointment is recognised for the Diploma of F.R.C.S. (Eng. and Edin.) and is a pre-registration post.

Applications, stating age, nationality, qualifications and experience, with copies of 2 recent testimonials, to be sent to the Group Secretary, Maelor General Hospital, Wrexham, as soon as possible.

NORTHERN IRELAND HOSPITALS AUTHORITY. Appointment of SENIOR HOUSE OFFICERS. Applications are invited for the following posts for the year commencing 1st October, 1955.

(1) **Belfast Group**
General Surgery—3 posts.
E.N.T. Surgery—2 posts.
Ophthalmology—2 posts.
General Medicine—1 post.
Paediatrics—1 post.
Dermatology—1 post.
Neurology—1 post.
Radiology—6 posts.
Anæsthetics—5 posts.
Physical Medicine—1 post.
Application to be made on a form obtainable from the Secretary, Belfast Hospital Management Committee, Royal Victoria Hospital, Belfast.

(2) **South Belfast Group**
General Surgery—2 posts.
Obstetrics and Gynæcology—3 posts.
Orthopædic Surgery—3 posts.
General Medicine—2 posts.
Anæsthetics—5 posts.
Gerontology—1 post.
Paediatrics—1 post.
Application to be made on a form obtainable from the Secretary, South Belfast Hospital Management Committee, Belfast City Hospital, Belfast.

(3) **North West Group**
General Surgery—1 post.
Obstetrics and Gynæcology—1 post.
General Medicine—1 post.
Anæsthetics—1 post.
Application to be made on a form obtainable from the Secretary, North West Hospital Management Committee, City and County Hospital, Londonderry.

(4) **North Armagh Group**
General Surgery—1 post.
Anæsthetics—1 post.
Application to be made on a form obtainable from the Secretary, North Armagh Hospital Management Committee, Lurgan and Portadown Hospital, Lurgan.

(5) **West Tyrone Group**
General Surgery—1 post.
General Medicine—1 post.
Anæsthetics—1 post.
Application to be made on a form obtainable from the Secretary, West Tyrone Hospital Management Committee, Tyrone County Hospital, Omagh.

(6) **Coleraine and Portrush Group**
General Medicine—1 post.
Application to be made on a form obtainable from the Secretary, Coleraine and Portrush Hospital Management Committee, Coleraine Hospital, Coleraine.

(7) **Forster Green Hospital**
Tuberculosis—1 post.
Thoracic Surgery—1 post at a new unit which is shortly to be opened.
Application to be made on a form obtainable from the Secretary, Forster Green Hospital Management Committee, Forster Green Hospital, Belfast.

(8) POSTS IN GENERAL SURGERY AT :—
(*a*) **East Antrim Group**
The Secretary, East Antrim Hospital Management Committee, Moyle Hospital, Larne.
(*b*) **Fermanagh Group**
The Secretary, Fermanagh Hospital Management Committee, Fermanagh County Hospital, Enniskillen.
(*c*) **Mid-Antrim Group**
The Secretary, Mid-Antrim Hospital Management Committee, Braid Valley Hospital, Ballymena.
(*d*) **South Tyrone Hospital**
The Secretary, South Tyrone Hospital Management Committee, South Tyrone Hospital, Dungannon.
(*e*) **Ulster Hospital for Children and Women**
The Secretary, Ulster Hospital Management Committee, Ulster Hospital for Children and Women, Whitehall parade, Belfast.
(*f*) **South Armagh Group**
The Secretary, South Armagh Hospital Management Committee, Armagh City Hospital, Armagh.

(9) POSTS IN OBSTETRICS AND GYNÆCOLOGY AT :—
(*a*) **Mid-Ulster Hospital**
The Secretary, Mid-Ulster Hospital Management Committee, Mid-Ulster Hospital, Magherafelt.
(*b*) **South Down Group**
The Secretary, South Down Hospital Management Committee, Daisy Hill Hospital, Newry.

(10) POSTS IN PSYCHIATRY AT :—
(*a*) **Purdysburn Hospital**
The Secretary, Purdysburn Hospital, Belfast.
(*b*) **Downshire Hospital**
The Secretary, Downshire Hospital, Downpatrick.
(*c*) **Tyrone and Fermanagh Hospital**
The Secretary, Tyrone and Fermanagh Hospital, Omagh.
(*d*) **Holywell Hospital**
The Secretary, Holywell Hospital, Antrim.
(*e*) **Londonderry and Gransha Hospital**
The Secretary, Londonderry and Gransha Hospital, Londonderry.
(*f*) **St. Luke's Hospital**
The Secretary, St. Luke's Hospital, Armagh.
(*g*) **Special Care Service**
The Secretary, Special Care Service, 104, University-street, Belfast.

Applications to be made on forms obtainable from the above-mentioned Secretaries.

Application forms must be returned so as to be received not later than 23rd July, 1955.

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WEST FIFE HOSPITALS BOARD OF MANAGEMENT. Applications are invited from medical practitioners (qualified or pre-registration—Male or Female), for 2 HOUSE OBSTETRICAL OFFICER posts at the Maternity Hospital, St. Leonard's, Dunfermline (56 Beds). Resident. The persons to be appointed will be required to take up duty on 1st September and 1st October respectively. Salary and conditions of service in accordance with National Health Service Whitley Council agreements. The Hospital is recognised by the Royal College of Obstetricians and Gynæcologists as a training school.

Apply to the Medical Superintendent.

WEST MALLING, KENT. LEYBOURNE GRANGE COLONY FOR MENTAL DEFECTIVES. (1372 Beds.) JUNIOR HOSPITAL MEDICAL OFFICER required at above Colony. Appointment subject to the terms and conditions for medical and dental staffs. Furnished or unfurnished married accommodation available. Ample facilities for study.

Applications, with full details as to age, nationality, qualifications, present post and previous experience, together with names and addresses of 2 referees, to the Group Secretary by 13th July, 1955.

YORKSHIRE. EAST RIDING HOSPITAL MANAGEMENT COMMITTEE.

Westwood Hospital, Beverley, Yorkshire (229 Beds)
Locum HOUSE OFFICER or SENIOR HOUSE OFFICER required immediately. Salary £9 10s. or £14 10s. a week respectively.

Applications to Group Secretary.

YORKSHIRE. EAST RIDING HOSPITAL MANAGEMENT COMMITTEE.

Westwood Hospital, Beverley, Yorks (229 Beds)
ORTHOPÆDIC HOUSE SURGEON (first, second, or third post). Offers good opportunity for general experience in busy acute general hospital. Approved pre-registration post. Fully qualified practitioners may apply. Recognised for F.R.C.S.

Apply to Group Secretary.

DUBLIN. NATIONAL CHILDREN'S HOSPITAL. Applications are invited for the post of MEDICAL REGISTRAR. Salary £650, less £150 for quarters and messing; 1 months leave p.a.

Applications, with full particulars, to the Secretary, Medical Committee, 88, Harcourt-street, Dublin.

NORTHERN IRELAND HOSPITALS AUTHORITY. Applications are invited for a whole-time post as REGISTRAR in Radiotherapy at the Radiotherapy Centre, Northern Ireland Fever Hospital, Belfast. The terms and conditions will be in accordance with the Authority's application of the Spens report to Northern Ireland.

Applications to be made on a form obtainable (with further particulars) from the Secretary, Northern Ireland Hospitals Authority, 44–46, Queen-street, Belfast, and to be returned not later than 23rd July, 1955.

CANADA. OTTAWA GENERAL HOSPITAL, Ottawa, ONTARIO. (600 Bed general hospital affiliated with the Medical School of the University of Ottawa.) Residencies vacant.

Pediatrics : 100 Beds Department, outpatient clinic, 70 cots nursery. 1 RESIDENT vacancy.
Psychiatry : 30 Beds department for active treatment, adult and child guidance clinics. 2 RESIDENT vacancies.
Pathology : large department, high rate of necropsies. 1 SENIOR INTERN vacancy.

These 3 departments are approved for 2 years postgraduate training by the Royal College of Physicians and Surgeons of Canada, for Specialist certification. Remuneration : Residents $1800. Senior Interns $1200 p.a., plus room, board, and uniform.

Apply to Mother Superior.

MICHIGAN, U.S.A. OAKWOOD HOSPITAL, Dearborn MICHIGAN. Applications are invited for 1 or 2 year General Practice RESIDENCY in new 230-Bed general hospital 10 miles from Detroit. Excellent facilities. Hospital approved for exchange-visitor programme. Salary begins at $275 per month.

Apply : Director.

Public Appointments

BIRMINGHAM. CITY OF BIRMINGHAM. Applications are invited for the post of Part-time PSYCHOLOGIST in the Mental Health Service of the Public Health Department. The appointment is on a sessional basis, approximately 5 sessions per week.

Further details may be obtained from the Medical Officer of Health, Public Health Department, Congreve-street, Birmingham, 3. Closing date for applications is 31st July, 1955.

LONDON TRANSPORT. Applications are invited from registered medical practitioners for a post of MEDICAL OFFICER (Woman). The successful applicant will be responsible to the Chief Medical Officer for general clinical work including the Junior Staff Health scheme and the medical supervision of working conditions. Commencing salary £1400 p.a. The appointment is subject to a medical examination. On completion of a satisfactory probationary period, the selected applicant will be expected to join a contributory superannuation scheme.

Applications, giving full details of qualifications and experience, together with the names of 3 referees, should be sent within 14 days of the appearance of this advertisement to the Staff Officer (F/EV540), London Transport, 55, Broadway, S.W.1.

NOTTINGHAM. CITY OF NOTTINGHAM EDUCATION COMMITTEE. Applications are invited for the post of SCHOOL MEDICAL OFFICER on the salary scale £975–£50–£1375 p.a. The appointment will be subject to the provisions of the Local Government superannuation acts.

Further particulars and forms of application may be obtained from the Principal School Medical Officer, 28, Chaucer-street, Nottingham. F. STEPHENSON, Director of Education.

DUBLIN. LOCAL APPOINTMENTS COMMISSION. Medical positions vacant.

(1) 3 ASSISTANT MEDICAL OFFICERS in the Tuberculosis Service of the Dublin Corporation. Salary £1000–£30–£1210 plus temporary bonus of £75.

(2) ANÆSTHETIST (part-time), Limerick County Council. Basic salary : £750. The duties will be performed mainly in the Regional Hospital, Limerick.

Application forms and particulars from the Secretary, 45, Upper O'Connell-street, Dublin. Latest time for receiving completed application forms 5 P.M. on 22nd July, 1955.

FACTORY DOCTORS. Factories Acts, 1937 and 1948. The following appointment as Appointed Factory Doctor is vacant. Apply to Chief Inspector of Factories, 19, St. James's-square, London, S.W.1.

District	*County*	*Latest date for receipt of applications*
CASTLETON	DERBY ..	.. 23RD JULY, 1955

FEDERATION OF MALAYA. Specialist Radiologists required to carry out diagnostic and therapeutic radiological work including the organisation and control of X-ray Departments in large general hospitals, and the training of staff. Equipment is modern and departments are reasonably up to date ; screening rooms and offices are air conditioned. There is a wealth of interesting clinical material.

Appointments are available :

(*a*) On short-term contract for 3 years resident service. Salary is £2128 p.a. In addition an expatriation allowance is paid to married officers without children at the rate of £133 p.a. and to married officers with children at the rate of £259 p.a. A temporary variable cost-of-living allowance is also payable at the rate of £42 p.a. for bachelors, £308 p.a. for married men without dependent children, and £413 p.a. for married men with dependent children. On satisfactory completion of contract a gratuity (taxable) is payable at the rate of £450 for each completed year of service.

(*b*) From the National Health Service. Applicants from the National Health Service may leave but retain their superannuation rights up to 6 years. Salary and allowances as at (*a*), but after satisfactory completion of appointment gratuity (taxable) is payable at the rate of 20% of the aggregate of their salary.

Regulated consulting practice is allowed for both types of appointment for which fees may be retained. In both types of appointment the rates of salary and gratuity refer to Radiologists eligible for expatriate terms under Malayan Regulations (i.e., those whose permanent homes are in the United Kingdom, Irish Republic, Australia, Canada, &c.). Candidates must possess medical qualifications registrable in the United Kingdom and a Diploma in Diagnostic Radiology. They should also have had at least 5 years practical radiological experience. A furnished house is normally provided at a nominal rent within a short period of arrival and a generous hotel allowance is paid if quarters are not immediately available. Leave on full pay at the end of the contract is earned at the rate of 45 days for each year of resident service. Free passages provided on first appointment and on satisfactory termination of engagement for Officers, their wives and children under the age of 10, not exceeding 5 persons in all. An interest free loan, repayable by monthly payments over 2–3 years may be obtained to buy a car. The climate in Malaya is healthy and children thrive up to the age of 9 or 10. Income-tax payable at Malayan rates.

Application forms from the Director of Recruitment, Colonial Office, Sanctuary Buildings, Great Smith-street, London, S.W.1 (quoting reference No. BCD. 117/23/04).

HER MAJESTY'S OVERSEA CIVIL SERVICE. Uganda. SPECIALIST ALIENIST required in the Uganda Medical Department to be in charge of the Mental Hospital, Mulago, and to undertake certain teaching duties at Makerere College. Candidates must be registered by the General Medical Council in the United Kingdom or possess qualifications entitling them to such registration, and also possess a Diploma in Psychological Medicine. Appointment can be made (subject to 2 years probation) on a permanent basis with pension (non-contributory) at the age of 45–55, or on short-term contract with gratuity. Salary scale £2000–£50–£2100 a year, plus a temporary (non-pensionable) cost-of-living allowance of £162 a year. Pension is earned at the rate of 1/600th of final pensionable emoluments for each completed month of service. The gratuity (taxable) in respect of contract service is 13⅓% of total salary drawn, not including allowances. Candidates in the National Health Service may leave the National Health Service but retain their superannuation rights up to 6 years and receive a gratuity (taxable) of 20% of the aggregate of their salary after the end of their engagements. Quarters are provided at rental varying from £21 to £60 a year ; items of hard furniture supplied at rental of £12–£24 a year. Free passages provided in both directions : for officers serving tour of 30–36 months, 4 tourist-class air passages provided for Officer, wife and dependent children or sea passages (first class) up to cost of 3 adult fares ; for officers serving short tours of 12–18 months, tourist passages provided for Officer, wife, and all dependent children. Educational subsidies are payable to officers, which vary from £90 a year (or half the school fees, whichever is less), for the primary education for the first child, to £140 (or three-fifths of school fees, whichever is less) for secondary education and additional £9 for second child and £18 in respect of third or subsequent children attending school at same time ; all subject to three-fifths fee not being less than subsidy. Education facilities are available in East Africa, though many parents send their children home to United Kingdom for secondary education. Income-tax at local rates. Local leave is permissible and generous home leave is granted after each tour.

Application forms from Director of Recruitment, Colonial Office, Sanctuary Buildings, Great Smith-street, London, S.W.1 (quoting reference No. BCD. 117/9/019).

HER MAJESTY'S OVERSEA CIVIL SERVICE. Medical BRANCH—KENYA. Vacancies exist for MEDICAL OFFICERS for general duties in the Medical Department of Kenya. A vacancy also exists for a MEDICAL OFFICER interested in Parasitology. Successful candidates may be posted to any station in Kenya. During the earlier years of service an officer will be expected to carry out general medical and surgical duties including a varying amount of public health administration. In most stations, even if remote from the larger towns, it is possible for an officer to maintain interest in any particular branch of medicine or surgery to which he is attracted. As far as possible the interests of an officer are considered when postings are made. The work of every Medical Officer is based on a hospital which may vary in size and facilities from a small district hospital meeting the needs of a comparatively primitive community to a large and modern provincial hospital. Appointments can be made on a permanent basis with pension (non-contributory) at age of 55, or on short-term contract with gratuity payable on satisfactory completion of service. Salary ranges from £1116 to £1836 a year ; starting point is determined by experience and 4 extra increments are given to successful candidates possessing the M.R.C.P., D.P.H., or other approved higher qualifications. Temporary cost-of-living allowance at the rate of 10% of salary is also payable, subject to a maximum of £162 a year making gross emoluments of £1228–£1998 a year. Permanent Medical Officers are eligible to be considered at any time for promotion to super-scale posts in Kenya and other territories in medical administration or, if they possess higher qualifications and suitable experience, in specialist posts. Quarters are generally available at rental of 10% of salary. Free passages in both directions for Officer and wife and up to cost of 1 adult fare for children. Taxation at local rates. Annual local leave permissible and generous home leave granted after each tour of from 40 to 48 months. Educational facilities are available. Candidates must possess medical qualification registrable in the United Kingdom and at least 1 years postgraduate hospital experience.

Application forms from Director of Recruitment, Colonial Office, Sanctuary Buildings, Great Smith-street, London, S.W.1 (quoting reference No. BCD.117/7/02).

HER MAJESTY'S OVERSEA CIVIL SERVICE. Sierra LEONE. A SENIOR PATHOLOGIST is required for service in the Medical Department of Sierra Leone. Duties include clinical pathology and forensic medicine. Candidates must be registered by the General Medical Council in the United Kingdom or possess qualifications entitling them to such registration, and must have a higher qualification in pathology or at least 7 years practical experience in the specialty.

Appointment may be made as follows :—

(*a*) On 3 years probation for permanent and pensionable employment with retiring age of between 45 and 55. Pensions (which are non-contributory) are at the rate of 1/600th of the final pensionable emoluments for each completed month of reckonable service.

(*b*) From the National Health Service. Candidates may resign but retain their superannuation rights up to 6 years and receive a gratuity (taxable) of 20% of the aggregate of their salary.

Salary, under (*a*) or (*b*) is £2200 a year, which includes pensionable expatriation pay and an annual special allowance.

(*c*) On short-term contract (2 tours of 18–24 months duration each) with inclusive salary of £2370 a year. On completion of contract a gratuity (taxable) is paid at the rate of £37 10s. for each completed period of 3 months service (including leave).

Quarters are normally available, at low rental. Free passages in both directions are provided for Officer, wife and up to 2 children under the age of 10. Income-tax at local rates. Local leave is permissible and generous home leave is granted after each tour of 18–24 months duration. The short tours of service enable frequent visits to be made to children being educated at home. Many officers have their children with them until they reach school age.

Application forms from the Director of Recruitment, Colonial Office, Sanctuary Buildings, Great Smith-street, London, S.W.1 (quoting reference No. BCD. 117/15/09).

YORKSHIRE. NORTH RIDING OF YORKSHIRE COUNTY COUNCIL. DEPUTY COUNTY MEDICAL OFFICER. Applications are invited for this whole-time post from registered medical practitioners holding a Degree or Diploma in Public Health. Previous experience in health administration is essential. The candidate appointed will be required to undertake any duties allotted to him bearing on the Health and School Health Services of the County. He will act under the administrative control of, and be responsible to, the County Medical Officer, who is also Principal School Medical Officer. He will be required to provide a car for which he will be paid on the County Council's scale. Salary £1600, rising to £1850 p.a. ; appointment superannuable. Canvassing in any form will disqualify.

Forms of application and further particulars obtainable from County Medical Officer, and returnable to the Clerk of the County Council, County Hall, Northallerton, before 23rd July, 1955.

THE MEDICAL SERVICE OF THE ROYAL NAVY

VACANCIES FOR MEDICAL OFFICERS

Candidates are invited for Short Service Commissions of 4 years, on termination of which a gratuity of £600 (tax free) is payable. Ample opportunity is granted for transfer to Permanent Commissions on completion of 1 year's total service. Officers so transferred are paid instead a grant of £1500 (taxable).

All entrants are required to be British subjects whose parents are British subjects, to be medically fit, and to pass an interview.

Full particulars from the Admiralty Medical Department, Queen Anne's Mansions, St. James's Park, London, S.W.1.

HER MAJESTY'S OVERSEA CIVIL SERVICE. Medical BRANCH—ZANZIBAR. MEDICAL OFFICER required for general medical and public health duties in Zanzibar. Appointment can be made on a permanent basis with pension (non-contributory) at the age of 45–55, or on short-term contract with gratuity (taxable) on satisfactory completion of service. Candidates in the National Health Service may leave the National Health Service but retain their superannuation rights up to 6 years and receive a taxable gratuity of 20% of the aggregate of their salary after their engagements. Salary scale ranges from £1116 to £1836 p.a. A temporary (non-pensionable) cost-of-living allowance of from £111 to £162 p.a., according to salary, is also payable. Starting salary will be determined according to qualifications and experience. Furnished quarters are provided at low rental. Free passages are provided in both directions for officer and family up to a cost of 3 adult passages. Income-tax at local rates. Local leave is permissible and generous home leave is granted after each tour of from 2 to 3 years. Educational facilities are available in East Africa. Candidates must be registered by the General Medical Council in the United Kingdom or possess qualifications entitling them to such registration. They must be prepared to train medical and health staff. Permanent Medical Officers are eligible to be considered at any time for promotion to super-scale posts in other territories in medical administration or, if they possess higher qualifications and suitable experience, in specialist posts.

Application forms from the Director of Recruitment, Colonial Office, Sanctuary Buildings, Great Smith-street, London, S.W.1 (quoting reference No. BCD. 117/10/01).

General Practice

For an Executive Council post (England and Wales) apply on form E.C.16A *obtainable from the council. Mark envelope "Vacancy."*

BATLEY, YORKSHIRE. Applications are invited for a general medical practice VACANCY in urban industrial area. List at present 2321. Surgery and residential accommodation available for purchase. Apply on Form E.C.16A to the undersigned, from whom further particulars and forms may be obtained. Closing date for applications 22nd July, 1955.

C. H. STABLER, Clerk.

The Executive Council of the West Riding of Yorkshire.
5, St. John's-north, Wakefield, Yorks.

BOOTLE, LANCASHIRE. Applications are invited for medical practice VACANCY (urban). List at present approximately 2600. Residence and surgery available for sale. Apply on Form E.C.16A before 30th July, 1955, to—

T. ARTHUR JONES, Clerk of the Council.

Bootle Executive Council, 61, Balliol-road, Bootle, Liverpool, 20.

SALFORD, LANCASHIRE. Retirement Vacancy (urban). List (1st April, 1955) 2123. Residence (including surgery) available. Applications (on Form E.C.16A obtainable from the Council's Offices) to reach the undersigned on or before 23rd July, 1955.

J. S. G. CLOUGH, F.C.I.I., Clerk,
Salford Executive Council.

Irwell-place, Crescent, Salford, 5.

FOR SALE. Old-established and well-conducted General Practice in Perth, Western Australia, suitable for well-experienced Physician and Surgeon, gross income £A7000. 8-room house available.—Address, No. 141, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Miscellaneous

To non-professional posts the Notification of Vacancies Order 1952 applies.

Glaxo Laboratories Ltd. The expansion of the activities of Glaxo Laboratories Ltd., in the field of biological research gives rise to several interesting posts for which the following staff will shortly be required :—

(*a*) At the Virus Research Laboratories, Stoke Poges, Bucks :—

(1) 2 graduates preferably in zoology or biochemistry with some postgraduate training in bacteriology for work on the metabolic and immunological problems of the assay of viruses by tissue culture techniques and the standardisation of virus vaccine potency tests. Previous experience in either tissue culture work or a virus laboratory would be a considerable advantage.

(2) A graduate in zoology preferably with training in protozoology and human and veterinary parasitology.

(*b*) At the Research Laboratories, Greenford, Middlesex :—

(1) A Bacteriologist preferably between the age of 30 and 35 with some years practical experience. A man with a knowledge of virus techniques would be especially useful.

(2) A male Zoologist between the age of 30 and 35 with a first-class degree and some research experience for work in connection with parasitology and helminthology.

The commencing salaries for each post will be determined individually by the qualifications and experience of the successful applicant. The posts are progressive and pensionable and carry participation in the Company's Incentive Scheme.

Apply in writing to Personnel Manager, Glaxo Laboratories Ltd., Greenford, Middlesex.

Medical Officer required by Falkland Islands Dependencies Air Survey for tour of 6 months service in Antarctic base. To leave U.K. in October, 1955. Salary £625 a year. Free passages, quarters, messing and canteen stores. Liberal leave on full salary. Candidates must possess qualifications registrable in the United Kingdom.—Write to the Crown Agents, 4, Millbank, London, S.W.1. State age, name in block letters, full qualifications and experience and quote M3A/35318/LD.

Lady medically trained wanted to work in a Pediatric Unit in Eastern Canada. Age 28–33. R.C. preferred. Immediate interview London.—Answer : Address, No. 147, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Medical Information Officer. Applications are invited from registered medical practitioners for appointment to the post of Medical Information Officer to a progressive Ethical Pharmaceutical Company in North West England. Applicants should have a sound clinical background, have kept themselves up to date and maintained a knowledge of, and interest in, the basic medical sciences ; experience of clinical research would be an advantage. Duties involve the provision of medical information and supervision of correspondence on medical matters and therefore ability to write clearly, simply and concisely is essential. The post also carries responsibility for assisting in the organisation and conduct of clinical trials of the Company's products, involving personal contact with outside clinicians and hospitals. The appointment is a permanent one carrying a salary commensurate with experience and qualifications, with membership of a contributory pension scheme. Applications will be dealt with in strict confidence.

Apply to : Address, No. 148, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Slough Industrial Health Service. Applications are invited for the posts of :—

(1) Medical Officer with effect from 1st October, 1955. General duties as works medical officer, and will be required to assist in the Rehabilitation Service, and in teaching. Previous experience in industrial medicine, general practice and physical medicine an advantage. Commencing salary in the neighbourhood of £1500 p.a. with car allowance to a maximum of £150. The post is superannuated. Further details can be obtained from the Medical Director.

(2) Resident Assistant Medical Officer with effect from 1st September, 1955. Candidates should be single, Male, and have had casualty experience. Duties entail supervision of the Emergency Casualty Service and acting as works medical officer to a large number of small firms. The post offers opportunities of gaining general experience in industrial medicine. Salary £800 p.a. with full residential emoluments. Car allowance to a maximum of £150.

Applications for either of the above posts should be sent to the Medical Director, Slough Industrial Health Service, Farnham-road, Slough, Bucks, with the names of 3 referees, not later than 30th. July

Assistant Physician, Church Missionary Society. A Woman Physician, married, age 30–40. Experience of overseas missionary work or keen interest in it also essential. Needed for 5 sessions weekly at the Society's headquarters, with special responsibility for the wives, fiancées, and children of missionaries. Emoluments at the rate of £70 p.a. for each half-day session per week. The appointment will fall vacant during September. Applications outside the above terms regretfully unacceptable.—Applications should be addressed to the Physician, CHURCH MISSIONARY SOCIETY, 6, Salisbury-square, London, E.C.4. The list will be closed on 28th July.

Experienced Secretary required for 2 Consultants.—Telephone : LANgham 3883.

Consulting-rooms, full and part time, and Houses in the medical area.—ELGOOD & Co., 1, Bentinck-street, W.1 (WELbeck 8974).

Large consulting-room, Upper Wimpole-street, with separate secretarial accommodation, to be let. Reasonable rent. —C. E. BEDFORD & Co., 10, Wigmore-street, W.1 (LANgham 3927).

Applicants for posts requiring testimonials copied or duplicated should communicate with MANTON SECRETARIAL SERVICE LTD., 98, Victoria-street, S.W.1 (Phone : VICtoria 0141), who are specialists in this kind of work.

Typewriting and Duplicating. First-class work at moder- ate prices by experienced medical typists.—SYBIL RANG, 21, Heath-street, Hampstead, London, N.W.3 (HAM. 5329/0504).

"Pregnancy Diagnosis by the Xenopus Method," 24-hour service. Send speciment of urine and £1 1s. fee. Hæmatology, Biochemistry, Flame Photometry.—WELBECK BIOLOGICAL LABORATORIES, 26, Park-crescent, Portland-place, W.1 (MUSeum 5386–7).

Portanæst for Sale. Portanæst with usual fittings and dental nose-piece and harness as well. First-class mechanical order. Price £40 or near offer.—Address, No. 145, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Austin. The New Show Models A.30, A.40, A.50 and A.90. Limited number of orders now acceptable from proven essential users for delivery ahead.—Demonstrations, easy terms, brochures, application forms on request, from H. A. SAUNDERS LIMITED, Austin House, 140–144, Golders Green-road, Golders Green, London, N.W.11.

Typewriting by well-educated, accurate Typist ; good experience medical, psychological terms.—Address, No. 146, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Microscopes. Highest prices paid for good modern types. Send or bring your equipment for valuation.—WALLACE HEATON LTD., 127, New Bond-street, W.1.

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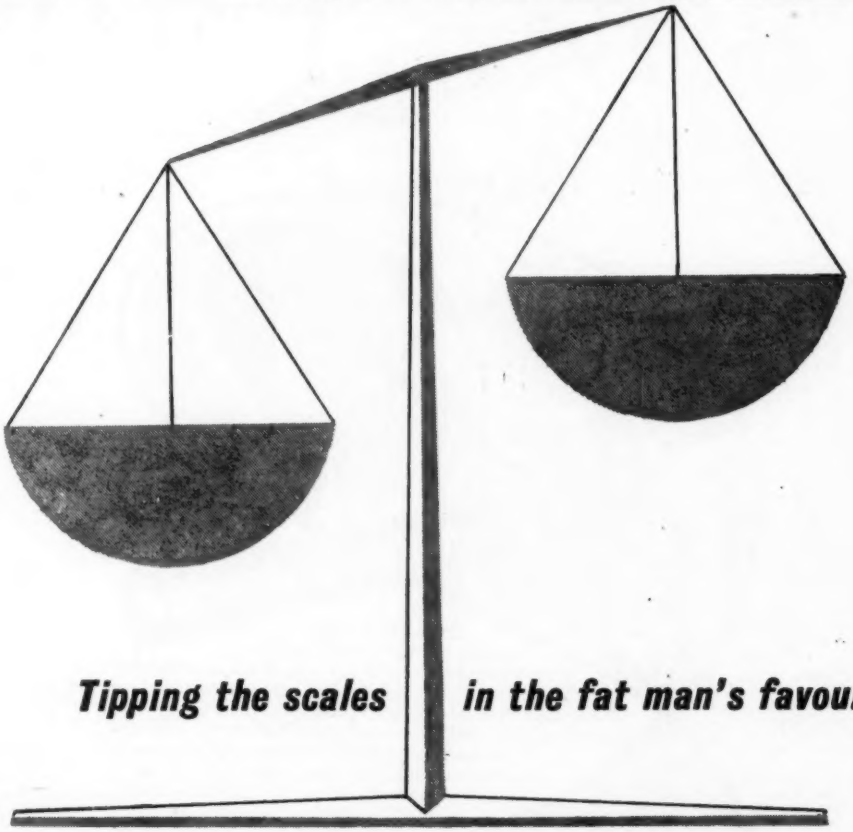

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